
PyVISA Documentation

Release 1.9.dev0

PyVISA Authors

October 14, 2015

1 General overview	3
2 User guide	5
2.1 Installation	5
2.2 Configuring the NI backend	6
2.3 Tutorial	6
2.4 Reading and Writing values	8
2.5 A more complex example	10
2.6 Resources	11
2.7 A frontend for multiple backends	13
2.8 PyVISA Shell	16
2.9 Architecture	18
3 More information	21
3.1 VISA resource names	21
3.2 Migrating from PyVISA < 1.5	23
3.3 Contributing to PyVISA	27
3.4 Frequently asked questions	28
3.5 NI-VISA Installation	31
3.6 API	32
Python Module Index	175



PyVISA is a Python package that enables you to control all kinds of measurement devices independently of the interface (e.g. GPIB, RS232, USB, Ethernet). As an example, reading self-identification from a Keithley Multimeter with GPIB number 12 is as easy as three lines of Python code:

```
>>> import visa
>>> rm = visa.ResourceManager()
>>> rm.list_resources()
('ASRL1::INSTR', 'ASRL2::INSTR', 'GPIBO::12::INSTR')
>>> inst = rm.open_resource('GPIBO::12::INSTR')
>>> print(inst.query("*IDN?"))
```

(That's the whole program; really!) It works on Windows, Linux and Mac; with arbitrary adapters (e.g. National Instruments, Agilent, Tektronix, Stanford Research Systems).

General overview

The programming of measurement instruments can be real pain. There are many different protocols, sent over many different interfaces and bus systems (e.g. GPIB, RS232, USB, Ethernet). For every programming language you want to use, you have to find libraries that support both your device and its bus system.

In order to ease this unfortunate situation, the Virtual Instrument Software Architecture (VISA) specification was defined in the middle of the 90ies. VISA is a standard for configuring, programming, and troubleshooting instrumentation systems comprising GPIB, VXI, PXI, Serial, Ethernet, and/or USB interfaces.

Today VISA is implemented on all significant operating systems. A couple of vendors offer VISA libraries, partly with free download. These libraries work together with arbitrary peripheral devices, although they may be limited to certain interface devices, such as the vendor's GPIB card.

The VISA specification has explicit bindings to Visual Basic, C, and G (LabVIEW's graphical language). However, you can use VISA with any language capable of calling functions in a shared library (*.dll*, *.so*, *.dylib*). PyVISA is Python wrapper for such shared library ... and more.

User guide

2.1 Installation

PyVISA is a frontend to the VISA library. It runs on Python 2.6+ and 3.2+.

You can install it using pip:

```
$ pip install -U pyvisa
```

2.1.1 NI Backend

In order for PyVISA to work, you need to have a suitable backend. PyVISA includes a backend that wraps the National Instruments's VISA library. However, you need to download and install the library yourself (See [NI-VISA Installation](#)). There are multiple VISA implementations from different vendors. PyVISA is tested only against National Instruments's VISA.

Warning: PyVISA works with 32- and 64-bit Python and can deal with 32- and 64-bit VISA libraries without any extra configuration. What PyVISA cannot do is open a 32-bit VISA library while running in 64-bit Python (or the other way around).

You need to make sure that the Python and VISA library have the same bitness

2.1.2 Testing your installation

That's all! You can check that PyVISA is correctly installed by starting up python, and creating a ResourceManager:

```
>>> import visa  
>>> rm = visa.ResourceManager()  
>>> print(rm.list_resources())
```

If you encounter any problem, take a look at the [Frequently asked questions](#). There you will find the solutions to common problem as well as useful debugging techniques. If everything fails, feel free to open an issue in our issue tracker

2.1.3 Using the development version

You can install the latest development version (at your own risk) directly from GitHub:

```
$ pip install -U https://github.com/hgrecco/pyvisa/zipball/master
```

Note: If you have an old system installation of Python and you don't want to mess with it, you can try [Anaconda CE](#). It is a free Python distribution by Continuum Analytics that includes many scientific packages.

2.2 Configuring the NI backend

Note: The NI backend requires that you install first the NI-VISA library. You can get info here: ([NI-VISA Installation](#))

In most cases PyVISA will be able to find the location of the shared visa library. If this does not work or you want to use another one, you need to provide the library path to the `pyvisa.highlevel.ResourceManager` constructor:

```
>>> rm = ResourceManager('Path to library')
```

You can make this library the default for all PyVISA applications by using a configuration file called `.pyvisarc` (mind the leading dot) in your `home` directory.

Operating System	Location
Windows NT	<root>\WINNT\Profiles\<username>
Windows 2000, XP and 2003	<root>\Documents and Settings\<username>
Windows Vista, 7 or 8	<root>\Users\<username>
Mac OS X	/Users/<username>
Linux	/home/<username> (depends on the distro)

For example in Windows XP, place it in your user folder “Documents and Settings” folder, e.g. `C:\Documents and Settings\smith\.pyvisarc` if “smith” is the name of your login account.

This file has the format of an INI file. For example, if the library is at `/usr/lib/libvisa.so.7`, the file `.pyvisarc` must contain the following:

```
[Paths]  
VISA library: /usr/lib/libvisa.so.7
```

Please note that `[Paths]` is treated case-sensitively.

You can define a site-wide configuration file at `/usr/share/pyvisa/.pyvisarc` (It may also be `/usr/local/...` depending on the location of your Python). Under Windows, this file is usually placed at `c:\Python27\share\pyvisa\.pyvisarc`.

If you encounter any problem, take a look at the [Frequently asked questions](#). There you will find the solutions to common problem as well as useful debugging techniques. If everything fails, feel free to open an issue in our [issue tracker](#)

2.3 Tutorial

Note: If you have been using PyVISA before version 1.5, you might want to read [Migrating from PyVISA < 1.5](#).

2.3.1 An example

Let's go *in medias res* and have a look at a simple example:

```
>>> import visa
>>> rm = visa.ResourceManager()
>>> rm.list_resources()
('ASRL1::INSTR', 'ASRL2::INSTR', 'GPIB0::14::INSTR')
>>> my_instrument = rm.open_resource('GPIB0::14::INSTR')
>>> print(my_instrument.query('*IDN?'))
```

This example already shows the two main design goals of PyVISA: preferring simplicity over generality, and doing it the object-oriented way.

After importing `visa`, we create a `ResourceManager` object. If called without arguments, PyVISA will use the default backend (NI) which tries to find the VISA shared library for you. You can check, the location of the shared library used simply by:

```
>>> print(rm)
<ResourceManager('/path/to/visa.so')>
```

Note: In some cases, PyVISA is not able to find the library for you resulting in an `OSError`. To fix it, find the library path yourself and pass it to the `ResourceManager` constructor. You can also specify it in a configuration file as discussed in [Configuring the NI backend](#).

Once that you have a `ResourceManager`, you can list the available resources using the `list_resources` method. The output is a tuple listing the [VISA resource names](#).

In this case, there is a GPIB instrument with instrument number 14, so you ask the `ResourceManager` to open ““GPIB0::14::INSTR”” and assign the returned object to the `my_instrument`.

Notice `open_resource` has given you an instance of `GPIBInstrument` class (a subclass of the more generic `Resource`).

```
>>> print(my_instrument)
<GPIBInstrument('GPIB::14')>
```

There many `Resource` subclasses representing the different types of resources, but you do not have to worry as the `ResourceManager` will provide you with the appropriate class. You can check the methods and attributes of each class in the [Resource classes](#)

Then, you query the device with the following message: ‘`*IDN?`’. Which is the standard GPIB message for “what are you?” or – in some cases – “what’s on your display at the moment?”. `query` is a short form for a `write` operation to send a message, followed by a `read`.

So:

```
>>> my_instrument.query("*IDN?")
```

is the same as:

```
>>> my_instrument.write('*IDN?')
>>> print(my_instrument.read())
```

2.3.2 Example for serial (RS232) device

Consider an Oxford ITC4 temperature controller, which is connected through COM2 with my computer. The following code prints its self-identification on the screen:

```
itc4 = rm.open_resource("COM2")
itc4.write("V")
print(itc4.read())
```

Instead of separate write and read operations, you can do both with one `query()` call. Thus, the above source code is equivalent to:

```
print(itc4.query("V"))
```

It couldn't be simpler.

2.4 Reading and Writing values

Some instruments allow to transfer to and from the computer larger datasets with a single query. A typical example is an oscilloscope, which you can query for the whole voltage trace. Or an arbitrary wave generator to which you have to transfer the function you want to generate.

Basically, data like this can be transferred in two ways: in ASCII form (slow, but human readable) and binary (fast, but more difficult to debug).

PyVISA Message Based Resources have two different methods for this called `pyvisa.resources.MessageBasedResource.query_ascii_values()` and `pyvisa.resources.MessageBasedResource.query_binary_values()`. It also has the convenient `pyvisa.resources.MessageBasedResource.query_values()` which will use follow a previously established configuration.

2.4.1 Reading ASCII values

If your oscilloscope (open in the variable `inst`) has been configured to transfer data in **ASCII** when the CURV? command is issued, you can just query the values like this:

```
>>> values = inst.query_ascii_values('CURV?')
```

values will be list containing the values from the device.

In many cases you do not want a list but rather a different container type such as a `numpy.array`. You can of course cast the data afterwards like this:

```
>>> values = np.array(inst.query_ascii_values('CURV?'))
```

but sometimes it is much more efficient to avoid the intermediate list, and in this case you can just specify the container type in the query:

```
>>> values = inst.query_ascii_values('CURV?', container=numpy.array)
```

In `container` you can have any callable/type that takes an iterable.

Some devices transfer data in ASCII but not as decimal numbers but rather hex or oct. Or you might want to receive an array of strings. In that case you can specify a converter. For example, if you expect to receive integers as hex:

```
>>> values = inst.query_ascii_values('CURV?', converter='x')
```

`converter` can be one of the Python string formatting codes. But you can also specify a callable that takes a single argument if needed. The default converter is '`f`'.

Finally, some devices might return the values separated in an uncommon way. For example if the returned values are separated by a '\$' you can do the following call:

```
>>> values = inst.query_ascii_values('CURV?', separator='$')
```

You can provide a function to takes a string and returns an iterable. Default value for the separator is ',', (comma)

2.4.2 Reading binary values

If your oscilloscope (open in the variable `inst`) has been configured to transfer data in **BINARY** when the CURV? command is issued, you need to know which type datatype (e.g. uint8, int8, single, double, etc) is being used. PyVISA use the same naming convention as the `struct` module.

You also need to know the *endianness*. PyVISA assumes little-endian as default. If you have doubles `d` in big endian the call will be:

```
>>> values = inst.query_binary_values('CURV?', datatype='d', is_big_endian=True)
```

You can also specify the output container type, just as it was shown before.

2.4.3 Writing ASCII values

To upload a function shape to arbitrary wave generator, the command might be `WLIST:WAVEform:DATA <waveform name>,<function data>` where `<waveform name>` tells the device under which name to store the data.

```
>>> values = list(range(100))
>>> inst.write_ascii_values('WLIST:WAVEform:DATA somename,', values)
```

Again, you can specify the converter code.

```
>>> inst.write_ascii_values('WLIST:WAVEform:DATA somename,', values, converter='x')
```

`converter` can be one of the Python `string` formatting codes. But you can also specify a callable that takes a single argument if needed. The default converter is '`f`'.

The separator can also be specified just like in `query_ascii_values`.

```
>>> inst.write_ascii_values('WLIST:WAVEform:DATA somename,', values, converter='x', separator='$')
```

You can provide a function to takes a iterable and returns an string. Default value for the separator is `,` (comma)

2.4.4 Writing binary values

To upload a function shape to arbitrary wave generator, the command might be `WLIST:WAVEform:DATA <waveform name>,<function data>` where `<waveform name>` tells the device under which name to store the data.

```
>>> values = list(range(100))
>>> inst.write_binary_values('WLIST:WAVEform:DATA somename,', values)
```

Again you can specify the datatype and endianness.

```
>>> inst.write_binary_values('WLIST:WAVEform:DATA somename,', values, datatype='d', is_big_endian=False)
```

2.4.5 Preconfiguring the transfer format

Most of the cases, each device will transfer data in the same format every time. And making the call so detailed everytime can be annoying. For this purpose, PyVISA provides a way to preconfigure the default. Each Message Based Resources exposes an attribute named `values_format` which is an object with the following properties: `is_binary`, `datatype`, `is_big_endian`, `container`. For example to set e.g. little-endian doubles and a numpy array:

```
>>> inst.values_format.is_binary = True
>>> inst.values_format.datatype = 'd'
>>> inst.values_format.is_big_endian = False
>>> inst.values_format.container = numpy.array
```

or shorter:

```
>>> inst.values_format.use_binary('d', False, numpy.array)
```

After doing this, you can simply call:

```
>>> inst.query_values('CURV?')
```

which will dispatch to the appropriate function and arguments.

If you want to default to ASCII transfer, preconfiguring is a little bit more cumbersome as you need to specify the converters for both ways.

For example with hex, with '\$' as separator:

```
>>> inst.values_format.is_binary = False
>>> inst.values_format.converter = 'x'
>>> inst.values_format.separator = '$'
>>> inst.values_format.container = numpy.array
```

or shorter:

```
>>> inst.values_format.use_ascii('x', '$', numpy.array)
```

This works for both query and write operations.

2.4.6 When things are not what they should be

PyVISA provides an easy way to transfer data from and to the device. The methods described above work fine for 99% of the cases but there is always a particular device that do not follow any of the standard protocols and is so different that cannot be adapted with the arguments provided above.

In those cases, you need to get the data:

```
>>> inst.write('CURV?')
>>> data = inst.read_raw()
```

and then you need to implement the logic to parse it.

2.5 A more complex example

The following example shows how to use SCPI commands with a Keithley 2000 multimeter in order to measure 10 voltages. After having read them, the program calculates the average voltage and prints it on the screen.

I'll explain the program step-by-step. First, we have to initialise the instrument:

```
>>> keithley = rm.open_resource("GPIB::12")
>>> keithley.write("*rst; status:preset; *cls")
```

Here, we create the instrument variable *keithley*, which is used for all further operations on the instrument. Immediately after it, we send the initialisation and reset message to the instrument.

The next step is to write all the measurement parameters, in particular the interval time (500ms) and the number of readings (10) to the instrument. I won't explain it in detail. Have a look at an SCPI and/or Keithley 2000 manual.

```
>>> interval_in_ms = 500
>>> number_of_readings = 10
>>> keithley.write("status:measurement:enable 512; *sre 1")
>>> keithley.write("sample:count %d" % number_of_readings)
>>> keithley.write("trigger:source bus")
>>> keithley.write("trigger:delay %f" % (interval_in_ms / 1000.0))
>>> keithley.write("trace:points %d" % number_of_readings)
>>> keithley.write("trace:feed sensel; feed:control next")
```

Okay, now the instrument is prepared to do the measurement. The next three lines make the instrument waiting for a trigger pulse, trigger it, and wait until it sends a "service request":

```
>>> keithley.write("initiate")
>>> keithley.assert_trigger()
>>> keithley.wait_for_srq()
```

With sending the service request, the instrument tells us that the measurement has been finished and that the results are ready for transmission. We could read them with `keithley.query("trace:data?")` however, then we'd get:

```
-000.0004E+0,-000.0005E+0,-000.0004E+0,-000.0007E+0,
-000.0000E+0,-000.0007E+0,-000.0008E+0,-000.0004E+0,
-000.0002E+0,-000.0005E+0
```

which we would have to convert to a Python list of numbers. Fortunately, the `query_ascii_values()` method does this work for us:

```
>>> voltages = keithley.query_ascii_values("trace:data?")
>>> print("Average voltage: ", sum(voltages) / len(voltages))
```

Finally, we should reset the instrument's data buffer and SRQ status register, so that it's ready for a new run. Again, this is explained in detail in the instrument's manual:

```
>>> keithley.query("status:measurement?")
>>> keithley.write("trace:clear; feed:control next")
```

That's it. 18 lines of lucid code. (Well, SCPI is awkward, but that's another story.)

2.6 Resources

A resource represents an instrument, e.g. a measurement device. There are multiple classes derived from resources representing the different available types of resources (eg. GPIB, Serial). Each contains the particular set of attributes and methods that are available by the underlying device.

You do not create this objects directly but they are returned by the `pyvisa.highlevel.ResourceManager.open_resource()` method of a `pyvisa.highlevel.ResourceManager`. In general terms, there are two main groups derived from `pyvisa.resources.Resource`, `pyvisa.resources.RegisterBasedResource` and `pyvisa.resources.MessageBasedResource`.

Note: The resource Python class to use is selected automatically from the resource name. However, you can force a Resource Python class:

```
>>> from pyvisa.resources import MessageBasedResource
>>> inst = rm.open('ASRL1::INSTR', resource_pyclass=MessageBasedResource)
```

The following sections explore the most common attributes of `Resource` and `MessageBased` (Serial, GPIB, etc) which are the ones you will encounter more often. For more information, refer to the [API](#).

2.6.1 Attributes Resource

session

Each communication channel to an instrument has a session handle which is unique. You can get this value:

```
>>> my_device.session  
10442240
```

If the resource is closed, an exception will be raised:

```
>>> inst.close()  
>>> inst.session  
Traceback (most recent call last):  
...  
pyvisa.errors.InvalidSession: Invalid session handle. The resource might be closed.
```

timeout

Very most VISA I/O operations may be performed with a timeout. If a timeout is set, every operation that takes longer than the timeout is aborted and an exception is raised. Timeouts are given per instrument in **milliseconds**.

For all PyVISA objects, a timeout is set with

```
my_device.timeout = 25000
```

Here, `my_device` may be a device, an interface or whatever, and its timeout is set to 25 seconds. To set an **infinite** timeout, set it to `None` or `float('+inf')` or:

```
del my_device.timeout
```

To set it to **immediate**, set it to `0` or a negative value. (Actually, any value smaller than 1 is considered immediate)

Now every operation of the resource takes as long as it takes, even indefinitely if necessary.

2.6.2 Attributes of MessageBase resources

Chunk length

If you read data from a device, you must store it somewhere. Unfortunately, PyVISA must make space for the data *before* it starts reading, which means that it must know how much data the device will send. However, it doesn't know *a priori*.

Therefore, PyVISA reads from the device in *chunks*. Each chunk is 20 kilobytes long by default. If there's still data to be read, PyVISA repeats the procedure and eventually concatenates the results and returns it to you. Those 20 kilobytes are large enough so that mostly one read cycle is sufficient.

The whole thing happens automatically, as you can see. Normally you needn't worry about it. However, some devices don't like to send data in chunks. So if you have trouble with a certain device and expect data lengths larger than the default chunk length, you should increase its value by saying e.g.

```
my_instrument.chunk_size = 102400
```

This example sets it to 100 kilobytes.

2.6.3 Termination characters

Somehow the computer must detect when the device is finished with sending a message. It does so by using different methods, depending on the bus system. In most cases you don't need to worry about termination characters because the defaults are very good. However, if you have trouble, you may influence termination characters with PyVISA.

Termination characters may be one character or a sequence of characters. Whenever this character or sequence occurs in the input stream, the read operation is terminated and the read message is given to the calling application. The next read operation continues with the input stream immediately after the last termination sequence. In PyVISA, the termination characters are stripped off the message before it is given to you.

You may set termination characters for each instrument, e.g.

```
my_instrument.read_termination = '\r'
```

(‘r’ is carriage return, usually appearing in the manuals as CR)

Alternatively you can give it when creating your instrument object:

```
my_instrument = rm.open_resource("GPIB::10", read_termination='\r')
```

The default value depends on the bus system. Generally, the sequence is empty, in particular for GPIB. For RS232 it's \r.

You can specify the character to add to each outgoing message using the `write_termination` attribute.

query_delay* and *send_end

There are two further options related to message termination, namely `send_end` and `query_delay`. `send_end` is a boolean. If it's `True` (the default), the EOI line is asserted after each write operation, signalling the end of the operation. EOI is GPIB-specific but similar action is taken for other interfaces.

The argument `query_delay` is the time in seconds to wait after each write operation. So you could write:

```
my_instrument = rm.open_resource("GPIB::10", send_end=False, delay=1.2)
```

This will set the delay to 1.2 seconds, and the EOI line is omitted. By the way, omitting EOI is *not* recommended, so if you omit it nevertheless, you should know what you're doing.

2.7 A frontend for multiple backends

A small historical note might help to make this section clearer. So bear with me for a couple of lines. Originally PyVISA was a Python wrapper to the VISA library. More specifically, it was `ctypes` wrapper around the NI-VISA. This approach worked fine but made it difficult to develop other ways to communicate with instruments in platforms where NI-VISA was not available. Users had to change their programs to use other packages with different API.

Since 1.6, PyVISA is a frontend to VISA. It provides a nice, Pythonic API and can connect to multiple backends. Each backend exposes a class derived from `VisaLibraryBase` that implements the low-level communication. The `ctypes` wrapper around NI-VISA is the default backend (called `ni`) and is bundled with PyVISA for simplicity.

You can specify the backend to use when you instantiate the resource manager using the @ symbol. Remembering that `ni` is the default, this:

```
>>> import visa
>>> rm = visa.ResourceManager()
```

is the same as this:

```
>>> import visa
>>> rm = visa.ResourceManager('@ni')
```

You can still provide the path to the library if needed:

```
>>> import visa
>>> rm = visa.ResourceManager('/path/to/lib@ni')
```

Under the hood, the `pyvisa.highlevel.ResourceManager` looks for the requested backend and instantiate the VISA library that it provides.

PyVISA locates backends by name. If you do:

```
>>> import visa
>>> rm = visa.ResourceManager('@somename')
```

PyVISA will try to import a package/module named `pyvisa-somename` which should be installed in your system. This is a loosely coupled configuration free method. PyVISA does not need to know about any backend out there until you actually try to use it.

You can list the installed backends by running the following code in the command line:

```
python -m visa info
```

2.7.1 Developing a new Backend

What does a minimum backend looks like? Quite simple:

```
from pyvisa.highlevel import VisaLibraryBase

class MyLibrary(VisaLibraryBase):
    pass

WRAPPER_CLASS = MyLibrary
```

Additionally you can provide a staticmethod named `get_debug_info` that should return a dictionary of debug information which is printed when you call `python -m visa info`

An important aspect of developing a backend is knowing which `VisaLibraryBase` method to implement and what API to expose.

A **complete** implementation of a VISA Library requires a lot of functions (basically almost all level 2 functions as described in [Architecture](#) (there is also a complete list at the bottom of this page). But a working implementation does not require all of them.

As a **very minimum** set you need:

- **open_default_resource_manager**: returns a session to the Default Resource Manager resource.
- **open**: Opens a session to the specified resource.
- **close**: Closes the specified session, event, or find list.
- **list_resources**: Returns a tuple of all connected devices matching query.

(you can get the signature below or here [Visa Library](#))

But of course you cannot do anything interesting with just this. In general you will also need:

- **get_attribute**: Retrieves the state of an attribute.
- **set_attribute**: Sets the state of an attribute.

If you need to start sending bytes to MessageBased instruments you will require:

- **read**: Reads data from device or interface synchronously.
- **write**: Writes data to device or interface synchronously.

For other usages or devices, you might need to implement other functions. Is really up to you and your needs.

These functions should raise a `pyvisa.errors.VisaIOError` or emit a `pyvisa.errors.VisaIOWarning` if necessary.

Complete list of level 2 functions to implement:

```
def read_memory(self, session, space, offset, width, extended=False):
def write_memory(self, session, space, offset, data, width, extended=False):
def move_in(self, session, space, offset, length, width, extended=False):
def move_out(self, session, space, offset, length, data, width, extended=False):
def peek(self, session, address, width):
def poke(self, session, address, width, data):
def assert_interrupt_signal(self, session, mode, status_id):
def assert_trigger(self, session, protocol):
def assert_utility_signal(self, session, line):
def buffer_read(self, session, count):
def buffer_write(self, session, data):
def clear(self, session):
def close(self, session):
def disable_event(self, session, event_type, mechanism):
def discard_events(self, session, event_type, mechanism):
def enable_event(self, session, event_type, mechanism, context=None):
def flush(self, session, mask):
def get_attribute(self, session, attribute):
def gpib_command(self, session, data):
def gpib_control_atn(self, session, mode):
def gpib_control_ren(self, session, mode):
def gpib_pass_control(self, session, primary_address, secondary_address):
def gpib_send_ifc(self, session):
def in_8(self, session, space, offset, extended=False):
def in_16(self, session, space, offset, extended=False):
def in_32(self, session, space, offset, extended=False):
def in_64(self, session, space, offset, extended=False):
def install_handler(self, session, event_type, handler, user_handle):
def list_resources(self, session, query='?*::INSTR'):
def lock(self, session, lock_type, timeout, requested_key=None):
def map_address(self, session, map_space, map_base, map_size,
def map_trigger(self, session, trigger_source, trigger_destination, mode):
def memory_allocation(self, session, size, extended=False):
def memory_free(self, session, offset, extended=False):
def move(self, session, source_space, source_offset, source_width, destination_space,
def move_asynchronously(self, session, source_space, source_offset, source_width,
def move_in_8(self, session, space, offset, length, extended=False):
def move_in_16(self, session, space, offset, length, extended=False):
def move_in_32(self, session, space, offset, length, extended=False):
def move_in_64(self, session, space, offset, length, extended=False):
def move_out_8(self, session, space, offset, length, data, extended=False):
```

```
def move_out_16(self, session, space, offset, length, data, extended=False):
def move_out_32(self, session, space, offset, length, data, extended=False):
def move_out_64(self, session, space, offset, length, data, extended=False):
def open(self, session, resource_name,
def open_default_resource_manager(self):
def out_8(self, session, space, offset, data, extended=False):
def out_16(self, session, space, offset, data, extended=False):
def out_32(self, session, space, offset, data, extended=False):
def out_64(self, session, space, offset, data, extended=False):
def parse_resource(self, session, resource_name):
def parse_resource_extended(self, session, resource_name):
def peek_8(self, session, address):
def peek_16(self, session, address):
def peek_32(self, session, address):
def peek_64(self, session, address):
def poke_8(self, session, address, data):
def poke_16(self, session, address, data):
def poke_32(self, session, address, data):
def poke_64(self, session, address, data):
def read(self, session, count):
def read_asynchronously(self, session, count):
def read_stb(self, session):
def read_to_file(self, session, filename, count):
def set_attribute(self, session, attribute, attribute_state):
def set_buffer(self, session, mask, size):
def status_description(self, session, status):
def terminate(self, session, degree, job_id):
def uninstall_handler(self, session, event_type, handler, user_handle=None):
def unlock(self, session):
def unmap_address(self, session):
def unmap_trigger(self, session, trigger_source, trigger_destination):
def usb_control_in(self, session, request_type_bitmap_field, request_id, request_value,
def usb_control_out(self, session, request_type_bitmap_field, request_id, request_value,
def vxi_command_query(self, session, mode, command):
def wait_on_event(self, session, in_event_type, timeout):
def write(self, session, data):
def write_asynchronously(self, session, data):
def write_from_file(self, session, filename, count):
```

2.8 PyVISA Shell

The shell, moved into PyVISA from the [Lantz](#) Project is a text based user interface to interact with instruments. You can invoke it from the command-line:

```
python -m visa shell
```

that will show something the following prompt:

```
Welcome to the VISA shell. Type help or ? to list commands.  
(visa)
```

At any time, you can type ? or help to get a list of valid commands:

```
(visa) help  
Documented commands (type help <topic>):
```

```
=====
EOF  attr  close  exit  help  list  open  query  read  write

(visa) help list
List all connected resources.
```

Tab completion is also supported.

The most basic task is listing all connected devices:

```
(visa) list
( 0) ASRL1::INSTR
( 1) ASRL2::INSTR
( 2) USB0::0x1AB1::0x0588::DS1K00005888::INSTR
```

Each device/port is assigned a number that you can use for subsequent commands. Let's open comport 1:

```
(visa) open 0
ASRL1::INSTR has been opened.
You can talk to the device using "write", "read" or "query".
The default end of message is added to each message
(open) query *IDN?
Some Instrument, Some Company.
```

We can also get a list of all visa attributes:

VISA name	Constant	Python name	val
VI_ATTR_ASRL_ALLOW_TRANSMIT	1073676734	allow_transmit	1
VI_ATTR_ASRL_AVAIL_NUM	1073676460	bytes_in_buffer	0
VI_ATTR_ASRL_BAUD	1073676321	baud_rate	9600
VI_ATTR_ASRL_BREAK_LEN	1073676733	break_length	250
VI_ATTR_ASRL_BREAK_STATE	1073676732	break_state	0
VI_ATTR_ASRL_CONNECTED	1073676731		VI_ERROR_NSUP_ATTRIBUTE
VI_ATTR_ASRL_CTS_STATE	1073676462		0
VI_ATTR_ASRL_DATA_BITS	1073676322	data_bits	8
VI_ATTR_ASRL_DCD_STATE	1073676463		0
VI_ATTR_ASRL_DISCARD_NULL	1073676464	discard_null	0
VI_ATTR_ASRL_DSR_STATE	1073676465		0
VI_ATTR_ASRL_DTR_STATE	1073676466		1
VI_ATTR_ASRL_END_IN	1073676467	end_input	2
VI_ATTR_ASRL_END_OUT	1073676468		0
VI_ATTR_ASRL_FLOW_CNTRL	1073676325		0
VI_ATTR_ASRL_PARITY	1073676323	parity	0
VI_ATTR_ASRL_REPLACE_CHAR	1073676478	replace_char	0
VI_ATTR_ASRL_RI_STATE	1073676479		0
VI_ATTR_ASRL_RTS_STATE	1073676480		1
VI_ATTR_ASRL_STOP_BITS	1073676324	stop_bits	10
VI_ATTR_ASRL_WIRE_MODE	1073676735		128
VI_ATTR_ASRL_XOFF_CHAR	1073676482	xoff_char	19
VI_ATTR_ASRL_XON_CHAR	1073676481	xon_char	17
VI_ATTR_DMA_ALLOW_EN	1073676318	allow_dma	0
VI_ATTR_FILE_APPEND_EN	1073676690		0
VI_ATTR_INTF_INST_NAME	3221160169		ASRL1 (/dev/cu.Blueooth-KL)
VI_ATTR_INTF_NUM	1073676662	interface_number	1
VI_ATTR_INTF_TYPE	1073676657		4
VI_ATTR_IO_PROT	1073676316	io_protocol	1
VI_ATTR_MAX_QUEUE_LENGTH	1073676293		50
VI_ATTR_RD_BUF_OPER_MODE	1073676330		3

VI_ATTR_RD_BUF_SIZE	1073676331		4096
VI_ATTR_RM_SESSION	1073676484		3160976
VI_ATTR_RSRC_CLASS	3221159937	resource_class	INSTR
VI_ATTR_RSRC_IMPL_VERSION	1073676291	implementation_version	5243392
VI_ATTR_RSRC_LOCK_STATE	1073676292	lock_state	0
VI_ATTR_RSRC_MANF_ID	1073676661		4086
VI_ATTR_RSRC_MANF_NAME	3221160308	resource_manufacturer_name	National Instrument
VI_ATTR_RSRC_NAME	3221159938	resource_name	A\$RL1::INSTR
VI_ATTR_RSRC_SPEC_VERSION	1073676656	spec_version	5243136
VI_ATTR_SEND_END_EN	1073676310	send_end	1
VI_ATTR_SUPPRESS_END_EN	1073676342		0
VI_ATTR_TERMCHAR	1073676312		10
VI_ATTR_TERMCHAR_EN	1073676344		0
VI_ATTR_TMO_VALUE	1073676314		2000
VI_ATTR_TRIG_ID	1073676663		-1
VI_ATTR_WR_BUF_OPER_MODE	1073676333		2
VI_ATTR_WR_BUF_SIZE	1073676334		4096

Finally, you can close the device:

```
(open) close
```

Cool, right? It will be great to have a GUI similar to NI-MAX, but we leave that to be developed outside PyVISA. Want to help? Let us know!

2.9 Architecture

PyVISA implements convenient and Pythonic programming in three layers:

1. Low-level: A wrapper around the shared visa library.

The wrapper defines the argument types and response types of each function, as well as the conversions between Python objects and foreign types.

You will normally not need to access these functions directly. If you do, it probably means that we need to improve layer 2.

All level 1 functions are **static methods** of `pyvisa.highlevel.VisaLibrary`.

Warning: Notice however that low-level functions might not be present in all backends. For broader compatibility, do no use this layer. All the functionality should be available via the next layer.

2. Middle-level: A wrapping Python function for each function of the shared visa library.

These functions call the low-level functions, adding some code to deal with type conversions for functions that return values by reference. These functions also have comprehensive and Python friendly documentation.

You only need to access this layer if you want to control certain specific aspects of the VISA library which are not implemented by the corresponding resource class.

All level 2 functions are **bound methods** of `pyvisa.highlevel.VisaLibrary`.

3. High-level: An object-oriented layer for `pyvisa.highlevel.ResourceManager` and `pyvisa.resources.Resource`

The `ResourceManager` implements methods to inspect connected resources. You also use this object to open other resources instantiating the appropriate `Resource` derived classes.

`Resource` and the derived classes implement functions and attributes access to the underlying resources in a Pythonic way.

Most of the time you will only need to instantiate a `ResourceManager`. For a given resource, you will use the `pyvisa.highlevel.ResourceManager.open_resource()` method to obtain the appropriate object. If needed, you will be able to access the `VisaLibrary` object directly using the `pyvisa.highlevel.ResourceManager.visalib` attribute.

The `VisaLibrary` does the low-level calls. In the default NI Backend, levels 1 and 2 are implemented in the same package called `pyvisa.ctwrapper` (which stands for ctypes wrapper). This package is included in PyVISA.

Other backends can be used just by passing the name of the backend to `ResourceManager` after the @ symbol. See more information in [A frontend for multiple backends](#).

2.9.1 Calling middle- and low-level functions

After you have instantiated the `ResourceManager`:

```
>>> import visa
>>> rm = visa.ResourceManager()
```

you can access the corresponding `VisaLibrary` instance under the `visalib` attribute.

As an example, consider the VISA function `viMapAddress`. It appears in the low-level layer as the static method `viMapAddress` of `visalib` attributed and also appears in the middle-level layer as `map_address`.

You can recognize low and middle-level functions by their names. Low-level functions carry the same name as in the shared library, and they are prefixed by `vi`. Middle-level functions have a friendlier, more pythonic but still recognizable name. Typically, camelCase names where stripped from the leading `vi` and changed to underscore separated lower case names. The docs about these methods is located here [API](#).

Low-level

You can access the low-level functions directly exposed as static methods, for example:

```
>>> rm.visalib.viMapAddress(<here goes the arguments>)
```

To call this functions you need to know the function declaration and how to interface it to python. To help you out, the `VisaLibrary` object also contains middle-level functions.

It is very likely that you will need to access the VISA constants using these methods. You can find the information about these constants here [api_constants](#)

Middle-level

The `VisaLibrary` object exposes the middle-level functions which are one-to-one mapped from the foreign library as bound methods.

Each middle-level function wraps one low-level function. In this case:

```
>>> rm.visalib.map_address(<here goes the arguments>)
```

The calling convention and types are handled by the wrapper.

More information

3.1 VISA resource names

If you use the function `open_resource()`, you must tell this function the *VISA resource name* of the instrument you want to connect to. Generally, it starts with the bus type, followed by a double colon ":", followed by the number within the bus. For example,

```
GPIB::10
```

denotes the GPIB instrument with the number 10. If you have two GPIB boards and the instrument is connected to board number 1, you must write

```
GPIB1::10
```

As for the bus, things like "GPIB", "USB", "ASRL" (for serial/parallel interface) are possible. So for connecting to an instrument at COM2, the resource name is

```
ASRL2
```

(Since only one instrument can be connected with one serial interface, there is no double colon parameter.) However, most VISA systems allow aliases such as "COM2" or "LPT1". You may also add your own aliases.

The resource name is case-insensitive. It doesn't matter whether you say "ASRL2" or "asrl2". For further information, I have to refer you to a comprehensive VISA description like <http://www.ni.com/pdf/manuals/370423a.pdf>.

3.1.1 VISA Resource Syntax and Examples

(This is adapted from the VISA manual)

The following table shows the grammar for the address string. Optional string segments are shown in square brackets ([]).

Interface	Syntax
ENET-Serial INSTR	ASRL[0]::host address::serial port::INSTR
GPIB INSTR	GPIB[board]::primary address[::secondary address][::INSTR]
GPIB INTFC	GPIB[board]::INTFC
PXI BACKPLANE	PXI[interface]::chassis number::BACKPLANE
PXI INSTR	PXI[bus]::device[:function][::INSTR]
PXI INSTR	PXI[interface]::bus-device[.function][::INSTR]
PXI INSTR	PXI[interface]::CHASSISchassis number::SLOTslot number[::FUNCfunction][::INSTR]
PXI MEMACC	PXI[interface]::MEMACC
Remote NI-VISA	visa://host address[:server port]/remote resource
Serial INSTR	ASRLboard[::INSTR]
TCPIP INSTR	TCPIP[board]::host address[::LAN device name][::INSTR]
TCPIP SOCKET	TCPIP[board]::host address::port::SOCKET
USB INSTR	USB[board]::manufacturer ID::model code::serial number[::USB interface number][::INSTR]
USB RAW	USB[board]::manufacturer ID::model code::serial number[::USB interface number]::RAW
VXI BACKPLANE	VXI[board]>::VXI logical address::BACKPLANE
VXI INSTR	VXI[board]::VXI logical address[::INSTR]
VXI MEMACC	VXI[board]::MEMACC
VXI SERVANT	VXI[board]::SERVANT

Use the GPIB keyword to establish communication with GPIB resources. Use the VXI keyword for VXI resources via embedded, MXibus, or 1394 controllers. Use the ASRL keyword to establish communication with an asynchronous serial (such as RS-232 or RS-485) device. Use the PXI keyword for PXI and PCI resources. Use the TCPIP keyword for Ethernet communication.

The following table shows the default value for optional string segments.

Optional String Segments	Default Value
board	0
GPIB secondary address	none
LAN device name	inst0
PXI bus	0
PXI function	0
USB interface number	lowest numbered relevant interface

The following table shows examples of address strings:

Address String	Description
ASRL::1.2.3.4::2::INSTR	serial device attached to port 2 of the ENET Serial controller at address 1.2.3.4.
ASRL1::INSTR	A serial device attached to interface ASRL1.
GPIB::1::0::INSTR	A GPIB device at primary address 1 and secondary address 0 in GPIB interface 0.
GPIB2::INTFC	Interface or raw board resource for GPIB interface 2.
PXI::15::INSTR	PXI device number 15 on bus 0 with implied function 0.
PXI::2::BACKPLANE	Backplane resource for chassis 2 on the default PXI system, which is interface 0.
PXI::CHASSIS1::SLOT3	PXI device in slot number 3 of the PXI chassis configured as chassis 1.
PXI0::2-12.1::INSTR	PXI bus number 2, device 12 with function 1.
PXI0::MEMACC	PXI MEMACC session.
TCPIP::dev.company.com	An TCP/IP device using VXI-11 or LXI located at the specified address. This uses the default LAN Device Name of inst0.
TCPIP0::1.2.3.4::999::SOCKTCP	TCP/IP access to port 999 at the specified IP address.
USB::0x1234::125::A22-5::INSTR	USB Test & Measurement class device with manufacturer ID 0x1234, model code 125, and serial number A22-5. This uses the device's first available USBTMC interface. This is usually number 0.
USB::0x5678::0x33::SN999::USBAN	USB class device with manufacturer ID 0x5678, model code 0x33, and serial number SN999. This uses the device's interface number 1.
visa://hostname/ASRL1::INSTR	Resource ASRL1::INSTR on the specified remote system.
VXI::1::BACKPLANE	Mainframe resource for chassis 1 on the default VXI system, which is interface 0.
VXI::MEMACC	Board-level register access to the VXI interface.
VXI0::1::INSTR	A VXI device at logical address 1 in VXI interface VXI0.
VXI0::SERVANT	Servant/device-side resource for VXI interface 0.

3.2 Migrating from PyVISA < 1.5

Note: if you want PyVISA 1.4 compatibility use PyVISA 1.5 that provides Python 3 support, better visa library detection heuristics, Windows, Linux and OS X support, and no singleton object. PyVISA 1.6+ introduces a few compatibility breaks.

Some of these decisions were inspired by the `visalib` package as a part of Lantz

3.2.1 Short summary

PyVISA 1.5 has full compatibility with previous versions of PyVISA using the legacy module (changing some of the underlying implementation). But you are encouraged to do a few things differently if you want to keep up with the latest developments and be compatible with PyVISA > 1.5.

Indeed PyVISA 1.6 breaks compatibility to bring across a few good things.

If you are doing:

```
>>> import visa
>>> keithley = visa.instrument("GPIB::12")
>>> print(keithley.ask("*IDN?"))
```

change it to:

```
>>> import visa
>>> rm = visa.ResourceManager()
>>> keithley = rm.open_resource("GPIB::12")
>>> print(keithley.query("*IDN?"))
```

If you are doing:

```
>>> print(visa.get_instruments_list())
```

change it to:

```
>>> print(rm.list_resources())
```

If you are doing:

```
>>> import pyvisa.vpp43 as vpp43  
>>> vpp43.visa_library.load_library("/path/to/my/libvisa.so.7")
```

change it to:

```
>>> import visa  
>>> rm = visa.ResourceManager("/path/to/my/libvisa.so.7")  
>>> lib = rm.visalib
```

If you are doing::

```
>>> vpp43.lock(session)
```

change it to:

```
>>> lib.lock(session)
```

or better:

```
>>> resource.lock()
```

If you are doing::

```
>>> inst.term_chars = '\r'
```

change it to:

```
>>> inst.read_termination = '\r'  
>>> inst.write_termination = '\r'
```

If you are doing::

```
>>> print(lib.status)
```

change it to:

```
>>> print(lib.last_status)
```

or even better, do it per resource:

```
>>> print(rm.last_status) # for the resource manager  
>>> print(inst.last_status) # for a specific instrument
```

If you are doing::

```
>>> inst.timeout = 1 # Seconds
```

change it to:

```
>>> inst.timeout = 1000 # Milliseconds
```

As you see, most of the code shown above is making a few things explicit. It adds 1 line of code (instantiating the ResourceManager object) which is not a big deal but it makes things cleaner.

If you were using `printf`, `queryf`, `scanf`, `sprintf` or `sscanf` of `vpp43`, rewrite as pure Python code (see below).

If you were using `Instrument.delay`, change your code or use `Instrument.query_delay` (see below).

A few alias has been created to ease the transition:

- `ask` -> `query`
- `ask_delay` -> `query_delay`
- `get_instrument` -> `open_resource`

3.2.2 A more detailed description

Dropped support for string related functions

The VISA library includes functions to search and manipulate strings such as `printf`, `queryf`, `scanf`, `sprintf` and `sscanf`. This makes sense as VISA involves a lot of string handling operations. The original PyVISA implementation wrapped these functions. But these operations are easily expressed in pure python and therefore were rarely used.

PyVISA 1.5 keeps these functions for backwards compatibility but they are removed in 1.6.

We suggest that you replace such functions by a pure Python version.

Isolated low-level wrapping module

In the original PyVISA implementation, the low level implementation (`vpp43`) was mixed with higher level constructs. The VISA library was wrapped using `ctypes`.

In 1.5, we refactored it as `ctwrapper`. This allows us to test the foreign function calls by isolating them from higher level abstractions. More importantly, it also allows us to build new low level modules that can be used as drop in replacements for `ctwrapper` in high level modules.

In 1.6, we made the `ResourceManager` the object exposed to the user. The type of the `VisaLibrary` can selected depending of the `library_path` and obtained from a plugin package.

We have two of such packages planned:

- a Mock module that allows you to test a PyVISA program even if you do not have VISA installed.
- a CFFI based wrapper. CFFI is new python package that allows easier and more robust wrapping of foreign libraries. It might be part of Python in the future.

PyVISA 1.5 keeps `vpp43` in the legacy subpackage (reimplemented on top of `ctwrapper`) to help with the migration. This module is gone in 1.6.

All functions that were present in `vpp43` are now present in `ctwrapper` but they take an additional first parameter: the foreign library wrapper.

We suggest that you replace `vpp43` by accessing the `VisaLibrary` object under the attribute `visalib` of the resource manager which provides all foreign functions as bound methods (see below).

No singleton objects

The original PyVISA implementation relied on a singleton, global objects for the library wrapper (named `visa_library`, an instance of the old `pyvisa.vpp43.VisaLibrary`) and the resource manager (named `resource_manager`, and instance of the old `pyvisa.visa.ResourceManager`). These were instantiated

on import and the user could rebind to a different library using the `load_library` method. Calling this method however did not affect `resource_manager` and might lead to an inconsistent state.

There were additionally a few global structures such a `status` which stored the last status returned by the library and the warning context to prevent unwanted warnings.

In 1.5, there is a new `VisaLibrary` class and a new `ResourceManager` class (they are both in `pyvisa.highlevel`). The new classes are not singletons, at least not in the strict sense. Multiple instances of `VisaLibrary` and `ResourceManager` are possible, but only if they refer to different foreign libraries. In code, this means:

```
>>> lib1 = visa.VisaLibrary("/path/to/my/libvisa.so.7")
>>> lib2 = visa.VisaLibrary("/path/to/my/libvisa.so.7")
>>> lib3 = visa.VisaLibrary("/path/to/my/libvisa.so.8")
>>> lib1 is lib2
True
>>> lib1 is lib3
False
```

Most of the time, you will not need access to a `VisaLibrary` object but to a `ResourceManager`. You can do:

```
>>> lib = visa.VisaLibrary("/path/to/my/libvisa.so.7")
>>> rm = lib.resource_manager
```

or equivalently:

```
>>> rm = visa.ResourceManager("/path/to/my/libvisa.so.7")
```

Note: If the path for the library is not given, the path is obtained from the user settings file (if exists) or guessed from the OS.

In 1.6, the state returned by the library is stored per resource. Additionally, warnings can be silenced by resource as well. You can access with the `last_status` property.

All together, these changes makes PyVISA thread safe.

VisaLibrary methods as way to call Visa functions

In the original PyVISA implementation, the `VisaLibrary` class was just having a reference to the `ctypes` library and a few functions.

In 1.5, we introduced a new `VisaLibrary` class (`pyvisa.highlevel`) which has every single low level function defined in `ctwrapper` as bound methods. In code, this means that you can do:

```
>>> import visa
>>> rm = visa.ResourceManager("/path/to/my/libvisa.so.7")
>>> lib = rm.visalib
>>> print(lib.read_stb(session))
```

(But it is very likely that you do not have to do it as the resource should have the function you need)

It also has every single VISA foreign function in the underlying library as static method. In code, this means that you can do:

```
>>> status = ctypes.c_ushort()
>>> ret = lib.viReadSTB(session, ctypes.byref(status))
>>> print(ret.value)
```

Ask vs. query

Historically, the method `ask` has been used in PyVISA to do a `write` followed by a `read`. But in many other programs this operation is called `query`. Thereby we have decided to switch the name, keeping an alias to help with the transition.

However, `ask_for_values` has not been aliased to `query_values` because the API is different. `ask_for_values` still uses the old formatting API which is limited and broken. We suggest that you migrate everything to `query_values`.

Seconds to milliseconds

The timeout is now in milliseconds (not in seconds as it was before). The reason behind this change is to make it coherent with all other VISA implementations out there. The C-API, LabVIEW, .NET: all use milliseconds. Using the same units not only makes it easy to migrate to PyVISA but also allows to profit from all other VISA docs out there without extra cognitive effort.

Removal of `Instrument.delay` and added `Instrument.query_delay`

In the original PyVISA implementation, `Instrument` takes a `delay` argument that adds a pause after each write operation (This also can be changed using the `delay` attribute).

In PyVISA 1.6, `delay` is removed. Delays after write operations must be added to the application code. Instead, a new attribute and argument `query_delay` is available. This allows you to pause between `write`` and ```read` operations inside `query`. Additionally, `query` takes an optional argument called `query` allowing you to change it for each method call.

Deprecated `term_chars` and automatic removal of CR + LF

In the original PyVISA implementation, `Instrument` takes a `term_chars` argument to change at the read and write termination characters. If this argument is `None`, `CR + LF` is appended to each outgoing message and not expected for incoming messages (although removed if present).

In PyVISA 1.6, `term_chars` is replaced by `read_termination`` and ```write_termination`. In this way, you can set independently the termination for each operation. Automatic removal of `CR + LF` is also gone in 1.6.

3.3 Contributing to PyVISA

You can contribute in different ways:

3.3.1 Report issues

You can report any issues with the package, the documentation to the PyVISA issue tracker. Also feel free to submit feature requests, comments or questions. In some cases, platform specific information is required. If you think this is the case, run the following command and paste the output into the issue:

```
python -m visa info
```

It is useful that you also provide the log output. To obtain it, add the following lines to your code:

```
import visa
visa.log_to_screen()
```

3.3.2 Contribute code

To contribute fixes, code or documentation to PyVISA, send us a patch, or fork PyVISA in [github](#) and submit the changes using a pull request.

You can also get the code from [PyPI](#) or [GitHub](#). You can either clone the public repository:

```
$ git clone git://github.com/hgrecco/pyvisa.git
```

Download the tarball:

```
$ curl -OL https://github.com/hgrecco/pyvisa/tarball/master
```

Or, download the zipball:

```
$ curl -OL https://github.com/hgrecco/pyvisa/zipball/master
```

Once you have a copy of the source, you can embed it in your Python package, or install it into your site-packages easily:

```
$ python setup.py install
```

Note: If you have an old system installation of Python and you don't want to mess with it, you can try [Anaconda CE](#). It is a free Python distribution by Continuum Analytics that includes many scientific packages.

3.3.3 Contributing to an existing backend

Backends are the central piece of PyVISA as they provide the low level communication over the different interfaces. There are a couple of backends in the wild which can use your help. Look them up in [PyPI](#) (try `pyvisa` in the search box) and see where you can help.

3.3.4 Contributing a new backend

If you think there is a new way that low level communication can be achieved, go for it. You can use any of the existing backends as a template or start a thread in the [issue tracker](#) and we will be happy to help you.

3.4 Frequently asked questions

3.4.1 Is PyVISA endorsed by National Instruments?

No. PyVISA is developed independently of National Instrument as a wrapper for the VISA library.

3.4.2 Who makes PyVISA?

PyVISA was originally programmed by Torsten Bronger and Gregor Thalhammer. It is based on earlier experiences by Thalhammer.

It was maintained from March 2012 to August 2013 by Florian Bauer. It is currently maintained by Hernan E. Grecco <hernan.grecco@gmail.com>.

Take a look at AUTHORS for more information

3.4.3 Is PyVISA thread-safe?

Yes, PyVISA is thread safe starting from version 1.6.

3.4.4 I have an error in my program and I am having trouble to fix it

PyVISA provides useful logs of all operations. Add the following commands to your program and run it again:

```
import visa
visa.log_to_screen()
```

3.4.5 I found a bug, how can I report it?

Please report it on the [Issue Tracker](#), including operating system, python version and library version. In addition you might add supporting information by pasting the output of this command:

```
python -m visa info
```

3.4.6 Error: Image not found

This error occurs when you have provided an invalid path for the VISA library. Check that the path provided to the constructor or in the configuration file

3.4.7 Error: Could not find VISA library

This error occurs when you have not provided a path for the VISA library and PyVISA is not able to find it for you. You can solve it by providing the library path to the `VisaLibrary` or `ResourceManager` constructor:

```
>>> visalib = VisaLibrary('/path/to/library')
```

or:

```
>>> rm = ResourceManager('Path to library')
```

or creating a configuration file as described in [Configuring the NI backend](#).

3.4.8 Error: No matching architecture

This error occurs when you the Python architecture does not match the VISA architecture.

Note: PyVISA tries to parse the error from the underlying foreign function library to provide a more useful error message. If it does not succeed, it shows the original one.

In Mac OS X the original error message looks like this:

```
OSError: dlopen(/Library/Frameworks/visa.framework/visa, 6): no suitable image found. Did find:  
/Library/Frameworks/visa.framework/visa: no matching architecture in universal wrapper  
/Library/Frameworks/visa.framework/visa: no matching architecture in universal wrapper
```

In Linux the original error message looks like this:

```
OSError: Could not open VISA library:  
Error while accessing /usr/local/vxipnp/linux/bin/libvisa.so.7:/usr/local/vxipnp/linux/bin/libvisa
```

First, determine the details of your installation with the help of the following debug command:

```
python -m visa info
```

You will see the ‘bitness’ of the Python interpreter and at the end you will see the list of VISA libraries that PyVISA was able to find.

The solution is to:

1. Install and use a VISA library matching your Python ‘bitness’

Download and install it from **National Instruments’s VISA**. Run the debug command again to see if the new library was found by PyVISA. If not, create a configuration file as described in [Configuring the NI backend](#).

If there is no VISA library with the correct bitness available, try solution 2.

or

2. Install and use a Python matching your VISA library ‘bitness’

In Windows and Linux: Download and install Python with the matching bitness. Run your script again using the new Python

In Mac OS X, Python is usually delivered as universal binary (32 and 64 bits).

You can run it in 32 bit by running:

```
arch -i386 python myscript.py
```

or in 64 bits by running:

```
arch -x86_64 python myscript.py
```

You can create an alias by adding the following line

```
alias python32="arch -i386 python"
```

into your .bashrc or .profile or ~/.bash_profile (or whatever file depending on which shell you are using.)

You can also create a [virtual environment](#) for this.

3.4.9 Where can I get more information about VISA?

- The original VISA docs:
 - VISA specification (scroll down to the end)
 - VISA library specification
 - VISA specification for textual languages
- The very good VISA manuals from National Instruments’s VISA:
 - NI-VISA User Manual

- NI-VISA Programmer Reference Manual
- NI-VISA help file in HTML

3.5 NI-VISA Installation

In every OS, the NI-VISA library bitness (i.e. 32- or 64-bit) has to match the Python bitness. So first you need to install a NI-VISA that works with your OS and then choose the Python version matching the installed NI-VISA bitness.

PyVISA includes a debugging command to help you troubleshoot this (and other things):

```
python -m visa info
```

According to National Instruments, NI VISA **5.4.1** is available for:

Note: NI-VISA is not available for your system, take a look at the *Frequently asked questions*.

3.5.1 Mac OS X

Download [NI-VISA for Mac OS X](#)

Supports:

- Mac OS X 10.7.x x86 and x86-64
- Mac OS X 10.8.x

64-bit VISA applications are supported for a limited set of instrumentation buses. The supported buses are ENET-Serial, USB, and TCPIP. Logging VISA operations in NI I/O Trace from 64-bit VISA applications is not supported.

3.5.2 Windows

Download [NI-VISA for Windows](#)

Supports:

- Windows Server 2003 R2 (32-bit version only)
- Windows Server 2008 R2 (64-bit version only)
- Windows 8 x64 Edition (64-bit version)
- Windows 8 (32-bit version)
- Windows 7 x64 Edition (64-bit version)
- Windows 7 (32-bit version)
- Windows Vista x64 Edition (64-bit version)
- Windows Vista (32-bit version)
- Windows XP Service Pack 3

Support for Windows Server 2003 R2 may require disabling physical address extensions (PAE).

3.5.3 Linux

Download [NI-VISA for Linux](#)

Supports:

- openSUSE 12.2
- openSUSE 12.1
- Red Hat Enterprise Linux Desktop + Workstation 6
- Red Hat Enterprise Linux Desktop + Workstation 5
- Scientific Linux 6.x
- Scientific Linux 5.x

Currently, only 32-bit applications are supported on the x86-64 architecture.

Note: NI-VISA runs on other linux distros but the installation is more cumbersome.

3.6 API

3.6.1 Visa Library

```
class pyvisa.highlevel.VisaLibraryBase
    Base for VISA library classes.
```

A class derived from *VisaLibraryBase* library provides the low-level communication to the underlying devices providing Pythonic wrappers to VISA functions. But not all derived class must/will implement all methods.

The default VisaLibrary class is `pyvisa.ctwrapper.highlevel.NIVisaLibrary`, which implements a ctypes wrapper around the NI-VISA library.

In general, you should not instantiate it directly. The object exposed to the user is the `pyvisa.highlevel.ResourceManager`. If needed, you can access the VISA library from it:

```
>>> import visa
>>> rm = visa.ResourceManager("/path/to/my/libvisa.so.7")
>>> lib = rm.visalib
```

assert_interrupt_signal(*session, mode, status_id*)

Asserts the specified interrupt or signal.

Corresponds to viAssertIntrSignal function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **mode** – How to assert the interrupt. (Constants ASSERT*)
- **status_id** – This is the status value to be presented during an interrupt acknowledge cycle.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

assert_trigger(*session, protocol*)

Asserts software or hardware trigger.

Corresponds to viAssertTrigger function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **protocol** – Trigger protocol to use during assertion. (Constants.PROT*)

Returns return value of the library call.**Return type** *pyvisa.constants.StatusCode***assert_utility_signal**(*session, line*)

Asserts or deasserts the specified utility bus signal.

Corresponds to viAssertUtilSignal function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **line** – specifies the utility bus signal to assert. (Constants.VI_UTIL_ASSERT*)

Returns return value of the library call.**Return type** *pyvisa.constants.StatusCode***buffer_read**(*session, count*)

Reads data from device or interface through the use of a formatted I/O read buffer.

Corresponds to viBufRead function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **count** – Number of bytes to be read.

Returns data read, return value of the library call.**Return type** bytes, *pyvisa.constants.StatusCode***buffer_write**(*session, data*)

Writes data to a formatted I/O write buffer synchronously.

Corresponds to viBufWrite function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **data** (bytes) – data to be written.

Returns number of written bytes, return value of the library call.**Return type** int, *pyvisa.constants.StatusCode***clear**(*session*)

Clears a device.

Corresponds to viClear function of the VISA library.

Parameters **session** – Unique logical identifier to a session.**Returns** return value of the library call.**Return type** *pyvisa.constants.StatusCode*

close(*session*)

Closes the specified session, event, or find list.

Corresponds to viClose function of the VISA library.

Parameters **session** – Unique logical identifier to a session, event, or find list.

Returns return value of the library call.

Return type *pyvisa.constants.StatusCode*

disable_event(*session*, *event_type*, *mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Corresponds to viDisableEvent function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

Returns return value of the library call.

Return type *pyvisa.constants.StatusCode*

discard_events(*session*, *event_type*, *mechanism*)

Discards event occurrences for specified event types and mechanisms in a session.

Corresponds to viDiscardEvents function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

Returns return value of the library call.

Return type *pyvisa.constants.StatusCode*

enable_event(*session*, *event_type*, *mechanism*, *context=None*)

Enable event occurrences for specified event types and mechanisms in a session.

Corresponds to viEnableEvent function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** –

Returns return value of the library call.

Return type *pyvisa.constants.StatusCode*

flush(*session, mask*)

Manually flushes the specified buffers associated with formatted I/O operations and/or serial communication.

Corresponds to viFlush function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **mask** – Specifies the action to be taken with flushing the buffer. (Constants.READ*, .WRITE*, .IO*)

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

get_attribute(*session, attribute*)

Retrieves the state of an attribute.

Corresponds to viGetAttribute function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session, event, or find list.
- **attribute** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource, return value of the library call.

Return type unicode (Py2) or str (Py3), list or other type,
`pyvisa.constants.StatusCode`

static get_debug_info()

Override this method to return an iterable of lines with the backend debug details.

get_last_status_in_session(*session*)

Last status in session.

Helper function to be called by resources properties.

static get_library_paths()

Override this method to return an iterable of possible library_paths to try in case that no argument is given.

gpib_command(*session, data*)

Write GPIB command bytes on the bus.

Corresponds to viGpibCommand function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **data** (bytes) – data to write.

Returns Number of written bytes, return value of the library call.

Return type int, `pyvisa.constants.StatusCode`

gpib_control_atn(*session, mode*)

Specifies the state of the ATN line and the local active controller state.

Corresponds to viGpibControlATN function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.

- **mode** – Specifies the state of the ATN line and optionally the local active controller state. (Constants.VI_GPIB_ATN*)

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

gpib_control_ren (*session, mode*)

Controls the state of the GPIB Remote Enable (REN) interface line, and optionally the remote/local state of the device.

Corresponds to viGpibControlREN function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **mode** – Specifies the state of the REN line and optionally the device remote/local state. (Constants.VI_GPIB_REN*)

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

gpib_pass_control (*session, primary_address, secondary_address*)

Tell the GPIB device at the specified address to become controller in charge (CIC).

Corresponds to viGpibPassControl function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **primary_address** – Primary address of the GPIB device to which you want to pass control.
- **secondary_address** – Secondary address of the targeted GPIB device. If the targeted device does not have a secondary address, this parameter should contain the value Constants.VI_NO_SEC_ADDR.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

gpib_send_ifc (*session*)

Pulse the interface clear line (IFC) for at least 100 microseconds.

Corresponds to viGpibSendIFC function of the VISA library.

Parameters **session** – Unique logical identifier to a session.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

handlers = None

Contains all installed event handlers. Its elements are tuples with three elements: The handler itself (a Python callable), the user handle (as a ct object) and the handler again, this time as a ct object created with CFUNCTYPE.

ignore_warning (**args*, ***kwds*)

A session dependent context for ignoring warnings

Parameters

- **session** – Unique logical identifier to a session.

- **warnings_constants** – constants identifying the warnings to ignore.

in_16 (*session*, *space*, *offset*, *extended=False*)

Reads in an 16-bit value from the specified memory space and offset.

Corresponds to viIn16* function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory, return value of the library call.

Return type int, *pyvisa.constants.StatusCode*

in_32 (*session*, *space*, *offset*, *extended=False*)

Reads in an 32-bit value from the specified memory space and offset.

Corresponds to viIn32* function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory, return value of the library call.

Return type int, *pyvisa.constants.StatusCode*

in_64 (*session*, *space*, *offset*, *extended=False*)

Reads in an 64-bit value from the specified memory space and offset.

Corresponds to viIn64* function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory, return value of the library call.

Return type int, *pyvisa.constants.StatusCode*

in_8 (*session*, *space*, *offset*, *extended=False*)

Reads in an 8-bit value from the specified memory space and offset.

Corresponds to viIn8* function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)

- **offset** – Offset (in bytes) of the address or register from which to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory, return value of the library call.

Return type int, `pyvisa.constants.StatusCode`

install_handler(*session*, *event_type*, *handler*, *user_handle*)

Installs handlers for event callbacks.

Corresponds to viInstallHandler function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns a handler descriptor which consists of three elements: - handler (a python callable) - user handle (a ctypes object) - ctypes handler (ctypes object wrapping handler) and return value of the library call.

Return type int, `pyvisa.constants.StatusCode`

install_visa_handler(*session*, *event_type*, *handler*, *user_handle=None*)

Installs handlers for event callbacks.

Parameters

- **session** – Unique logical identifier to a session.
- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

issue_warning_on = None

Set error codes on which to issue a warning. set

last_status

Last return value of the library.

list_resources(*session*, *query=u'?:INSTR'*)

Returns a tuple of all connected devices matching query.

Parameters *query* – regular expression used to match devices.

lock(*session*, *lock_type*, *timeout*, *requested_key=None*)

Establishes an access mode to the specified resources.

Corresponds to viLock function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.

- **lock_type** – Specifies the type of lock requested, either Constants.EXCLUSIVE_LOCK or Constants.SHARED_LOCK.
- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error.
- **requested_key** – This parameter is not used and should be set to VI_NULL when lockType is VI_EXCLUSIVE_LOCK.

Returns access_key that can then be passed to other sessions to share the lock, return value of the library call.

Return type str, `pyvisa.constants.StatusCode`

map_address (*session*, *map_space*, *map_base*, *map_size*, *access=False*, *suggested=None*)

Maps the specified memory space into the process's address space.

Corresponds to viMapAddress function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **map_space** – Specifies the address space to map. (Constants.*SPACE*)
- **map_base** – Offset (in bytes) of the memory to be mapped.
- **map_size** – Amount of memory to map (in bytes).
- **access** –
- **suggested** – If not Constants.VI_NULL (0), the operating system attempts to map the memory to the address specified in suggested. There is no guarantee, however, that the memory will be mapped to that address. This operation may map the memory into an address region different from suggested.

Returns address in your process space where the memory was mapped, return value of the library call.

Return type address, `pyvisa.constants.StatusCode`

map_trigger (*session*, *trigger_source*, *trigger_destination*, *mode*)

Map the specified trigger source line to the specified destination line.

Corresponds to viMapTrigger function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **trigger_source** – Source line from which to map. (Constants.VI_TRIG*)
- **trigger_destination** – Destination line to which to map. (Constants.VI_TRIG*)
- **mode** –

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

memory_allocation (*session*, *size*, *extended=False*)

Allocates memory from a resource's memory region.

Corresponds to viMemAlloc* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.

- **size** – Specifies the size of the allocation.
- **extended** – Use 64 bits offset independent of the platform.

Returns offset of the allocated memory, return value of the library call.

Return type `offset, pyvisa.constants.StatusCode`

memory_free (*session, offset, extended=False*)

Frees memory previously allocated using the `memory_allocation()` operation.

Corresponds to `viMemFree*` function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **offset** – Offset of the memory to free.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

move (*session, source_space, source_offset, source_width, destination_space, destination_offset, destination_width, length*)

Moves a block of data.

Corresponds to `viMove` function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **source_space** – Specifies the address space of the source.
- **source_offset** – Offset of the starting address or register from which to read.
- **source_width** – Specifies the data width of the source.
- **destination_space** – Specifies the address space of the destination.
- **destination_offset** – Offset of the starting address or register to which to write.
- **destination_width** – Specifies the data width of the destination.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

move_asynchronously (*session, source_space, source_offset, source_width, destination_space, destination_offset, destination_width, length*)

Moves a block of data asynchronously.

Corresponds to `viMoveAsync` function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **source_space** – Specifies the address space of the source.
- **source_offset** – Offset of the starting address or register from which to read.
- **source_width** – Specifies the data width of the source.

- **destination_space** – Specifies the address space of the destination.
- **destination_offset** – Offset of the starting address or register to which to write.
- **destination_width** – Specifies the data width of the destination.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.

Returns Job identifier of this asynchronous move operation, return value of the library call.

Return type jobid, `pyvisa.constants.StatusCode`

move_in (*session*, *space*, *offset*, *length*, *width*, *extended=False*)

Moves a block of data to local memory from the specified address space and offset.

Corresponds to viMoveIn* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from the bus, return value of the library call.

Return type list, `pyvisa.constants.StatusCode`

move_in_16 (*session*, *space*, *offset*, *length*, *extended=False*)

Moves an 16-bit block of data from the specified address space and offset to local memory.

Corresponds to viMoveIn16* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from the bus, return value of the library call.

Return type list, `pyvisa.constants.StatusCode`

move_in_32 (*session*, *space*, *offset*, *length*, *extended=False*)

Moves an 32-bit block of data from the specified address space and offset to local memory.

Corresponds to viMoveIn32* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)

- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from the bus, return value of the library call.

Return type list, `pyvisa.constants.StatusCode`

move_in_64 (*session*, *space*, *offset*, *length*, *extended=False*)

Moves an 64-bit block of data from the specified address space and offset to local memory.

Corresponds to viMoveIn64* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from the bus, return value of the library call.

Return type list, `pyvisa.constants.StatusCode`

move_in_8 (*session*, *space*, *offset*, *length*, *extended=False*)

Moves an 8-bit block of data from the specified address space and offset to local memory.

Corresponds to viMoveIn8* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from the bus, return value of the library call.

Return type list, `pyvisa.constants.StatusCode`

move_out (*session*, *space*, *offset*, *length*, *data*, *width*, *extended=False*)

Moves a block of data from local memory to the specified address space and offset.

Corresponds to viMoveOut* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.

- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **data** – Data to write to bus.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

move_out_16 (*session, space, offset, length, data, extended=False*)

Moves an 16-bit block of data from local memory to the specified address space and offset.

Corresponds to viMoveOut16* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **data** – Data to write to bus.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

move_out_32 (*session, space, offset, length, data, extended=False*)

Moves an 32-bit block of data from local memory to the specified address space and offset.

Corresponds to viMoveOut32* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **data** – Data to write to bus.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

move_out_64 (*session, space, offset, length, data, extended=False*)

Moves an 64-bit block of data from local memory to the specified address space and offset.

Corresponds to viMoveOut64* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **data** – Data to write to bus.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

move_out_8 (`session, space, offset, length, data, extended=False`)

Moves an 8-bit block of data from local memory to the specified address space and offset.

Corresponds to viMoveOut8* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **data** – Data to write to bus.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

Corresponds to viMoveOut8 function of the VISA library.

open (`session, resource_name, access_mode=<AccessModes.no_lock: 0>, open_timeout=0`)

Opens a session to the specified resource.

Corresponds to viOpen function of the VISA library.

Parameters

- **session** – Resource Manager session (should always be a session returned from `open_default_resource_manager()`).
- **resource_name** – Unique symbolic name of a resource.
- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** – Specifies the maximum time period (in milliseconds) that this operation waits before returning an error.

Returns Unique logical identifier reference to a session, return value of the library call.

Return type `session, pyvisa.constants.StatusCode`

open_default_resource_manager()

This function returns a session to the Default Resource Manager resource.

Corresponds to viOpenDefaultRM function of the VISA library.

Returns Unique logical identifier to a Default Resource Manager session, return value of the library call.

Return type `session, pyvisa.constants.StatusCode`

out_16 (`session, space, offset, data, extended=False`)

Write in an 16-bit value from the specified memory space and offset.

Corresponds to viOut16* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **data** – Data to write to bus.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

out_32 (`session, space, offset, data, extended=False`)

Write in an 32-bit value from the specified memory space and offset.

Corresponds to viOut32* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **data** – Data to write to bus.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

out_64 (`session, space, offset, data, extended=False`)

Write in an 64-bit value from the specified memory space and offset.

Corresponds to viOut64* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **data** – Data to write to bus.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

out_8 (*session*, *space*, *offset*, *data*, *extended=False*)

Write in an 8-bit value from the specified memory space and offset.

Corresponds to viOut8* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **data** – Data to write to bus.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

parse_resource (*session*, *resource_name*)

Parse a resource string to get the interface information.

Corresponds to viParseRsrc function of the VISA library.

Parameters

- **session** – Resource Manager session (should always be the Default Resource Manager for VISA returned from `open_default_resource_manager()`).
- **resource_name** – Unique symbolic name of a resource.

Returns Resource information with interface type and board number, return value of the library call.

Return type `pyvisa.highlevel.ResourceInfo, pyvisa.constants.StatusCode`

parse_resource_extended (*session*, *resource_name*)

Parse a resource string to get extended interface information.

Corresponds to viParseRsrcEx function of the VISA library.

Parameters

- **session** – Resource Manager session (should always be the Default Resource Manager for VISA returned from `open_default_resource_manager()`).
- **resource_name** – Unique symbolic name of a resource.

Returns Resource information, return value of the library call.

Return type `pyvisa.highlevel.ResourceInfo, pyvisa.constants.StatusCode`

peek (*session*, *address*, *width*)

Read an 8, 16 or 32-bit value from the specified address.

Corresponds to viPeek* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **address** – Source address to read the value.
- **width** – Number of bits to read.

Returns Data read from bus, return value of the library call.

Return type bytes, `pyvisa.constants.StatusCode`

peek_16 (*session, address*)

Read an 16-bit value from the specified address.

Corresponds to viPeek16 function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **address** – Source address to read the value.

Returns Data read from bus, return value of the library call.

Return type bytes, `pyvisa.constants.StatusCode`

peek_32 (*session, address*)

Read an 32-bit value from the specified address.

Corresponds to viPeek32 function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **address** – Source address to read the value.

Returns Data read from bus, return value of the library call.

Return type bytes, `pyvisa.constants.StatusCode`

peek_64 (*session, address*)

Read an 64-bit value from the specified address.

Corresponds to viPeek64 function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **address** – Source address to read the value.

Returns Data read from bus, return value of the library call.

Return type bytes, `pyvisa.constants.StatusCode`

peek_8 (*session, address*)

Read an 8-bit value from the specified address.

Corresponds to viPeek8 function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **address** – Source address to read the value.

Returns Data read from bus, return value of the library call.

Return type bytes, `pyvisa.constants.StatusCode`

poke (*session, address, width, data*)

Writes an 8, 16 or 32-bit value from the specified address.

Corresponds to viPoke* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.

- **address** – Source address to read the value.
- **width** – Number of bits to read.
- **data** – Data to be written to the bus.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

poke_16 (*session, address, data*)

Write an 16-bit value from the specified address.

Corresponds to viPoke16 function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **address** – Source address to read the value.
- **data** – value to be written to the bus.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

poke_32 (*session, address, data*)

Write an 32-bit value from the specified address.

Corresponds to viPoke32 function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **address** – Source address to read the value.
- **data** – value to be written to the bus.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

poke_64 (*session, address, data*)

Write an 64-bit value from the specified address.

Corresponds to viPoke64 function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **address** – Source address to read the value.
- **data** – value to be written to the bus.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

poke_8 (*session, address, data*)

Write an 8-bit value from the specified address.

Corresponds to viPoke8 function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.

- **address** – Source address to read the value.
- **data** – value to be written to the bus.

Returns Data read from bus.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

read(*session, count*)

Reads data from device or interface synchronously.

Corresponds to viRead function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **count** – Number of bytes to be read.

Returns data read, return value of the library call.

Return type `bytes, pyvisa.constants.StatusCode`

read_asynchronously(*session, count*)

Reads data from device or interface asynchronously.

Corresponds to viReadAsync function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **count** – Number of bytes to be read.

Returns result, jobid, return value of the library call.

Return type `ctypes.buffer, jobid, pyvisa.constants.StatusCode`

read_memory(*session, space, offset, width, extended=False*)

Reads in an 8-bit, 16-bit, 32-bit, or 64-bit value from the specified memory space and offset.

Corresponds to viIn* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (`Constants.*SPACE*`)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory, return value of the library call.

Return type `int, pyvisa.constants.StatusCode`

read_stb(*session*)

Reads a status byte of the service request.

Corresponds to viReadSTB function of the VISA library.

Parameters `session` – Unique logical identifier to a session.

Returns Service request status byte, return value of the library call.

Return type int, *pyvisa.constants.StatusCode*

read_to_file (*session*, *filename*, *count*)

Read data synchronously, and store the transferred data in a file.

Corresponds to viReadToFile function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **filename** – Name of file to which data will be written.
- **count** – Number of bytes to be read.

Returns Number of bytes actually transferred, return value of the library call.

Return type int, *pyvisa.constants.StatusCode*

resource_manager = None

Default ResourceManager instance for this library.

set_attribute (*session*, *attribute*, *attribute_state*)

Sets the state of an attribute.

Corresponds to viSetAttribute function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **attribute** – Attribute for which the state is to be modified. (Attributes.*)
- **attribute_state** – The state of the attribute to be set for the specified object.

Returns return value of the library call.

Return type *pyvisa.constants.StatusCode*

set_buffer (*session*, *mask*, *size*)

Sets the size for the formatted I/O and/or low-level I/O communication buffer(s).

Corresponds to viSetBuf function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **mask** – Specifies the type of buffer. (Constants.VI_READ_BUF, .VI_WRITE_BUF, .VI_IO_IN_BUF, .VI_IO_OUT_BUF)
- **size** – The size to be set for the specified buffer(s).

Returns return value of the library call.

Return type *pyvisa.constants.StatusCode*

status_description (*session*, *status*)

Returns a user-readable description of the status code passed to the operation.

Corresponds to viStatusDesc function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **status** – Status code to interpret.

Returns

- The user-readable string interpretation of the status code passed to the operation,
- return value of the library call.

Return type

- unicode (Py2) or str (Py3)
- `pyvisa.constants.StatusCode`

terminate(*session*, *degree*, *job_id*)

Requests a VISA session to terminate normal execution of an operation.

Corresponds to viTerminate function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **degree** – Constants.NULL
- **job_id** – Specifies an operation identifier.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`**uninstall_all_visa_handlers**(*session*)

Uninstalls all previously installed handlers for a particular session.

Parameters **session** – Unique logical identifier to a session. If None, operates on all sessions.

uninstall_handler(*session*, *event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events.

Corresponds to viUninstallHandler function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely in a session for an event.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`**uninstall_visa_handler**(*session*, *event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events.

Parameters

- **session** – Unique logical identifier to a session.
- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by install_visa_handler.

unlock (*session*)

Relinquishes a lock for the specified resource.

Corresponds to viUnlock function of the VISA library.

Parameters **session** – Unique logical identifier to a session.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

unmap_address (*session*)

Unmaps memory space previously mapped by map_address().

Corresponds to viUnmapAddress function of the VISA library.

Parameters **session** – Unique logical identifier to a session.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

unmap_trigger (*session*, *trigger_source*, *trigger_destination*)

Undo a previous map from the specified trigger source line to the specified destination line.

Corresponds to viUnmapTrigger function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **trigger_source** – Source line used in previous map. (Constants.VI_TRIG*)
- **trigger_destination** – Destination line used in previous map. (Constants.VI_TRIG*)

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

usb_control_in (*session*, *request_type_bitmap_field*, *request_id*, *request_value*, *index*, *length*=0)

Performs a USB control pipe transfer from the device.

Corresponds to viUsbControlIn function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **request_type_bitmap_field** – bmRequestType parameter of the setup stage of a USB control transfer.
- **request_id** – bRequest parameter of the setup stage of a USB control transfer.
- **request_value** – wValue parameter of the setup stage of a USB control transfer.
- **index** – wIndex parameter of the setup stage of a USB control transfer. This is usually the index of the interface or endpoint.
- **length** – wLength parameter of the setup stage of a USB control transfer. This value also specifies the size of the data buffer to receive the data from the optional data stage of the control transfer.

Returns

- The data buffer that receives the data from the optional data stage of the control transfer
- return value of the library call.

Return type

- bytes
- `pyvisa.constants.StatusCode`

usb_control_out (`session, request_type_bitmap_field, request_id, request_value, index, data=u''`)

Performs a USB control pipe transfer to the device.

Corresponds to viUsbControlOut function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **request_type_bitmap_field** – bmRequestType parameter of the setup stage of a USB control transfer.
- **request_id** – bRequest parameter of the setup stage of a USB control transfer.
- **request_value** – wValue parameter of the setup stage of a USB control transfer.
- **index** – wIndex parameter of the setup stage of a USB control transfer. This is usually the index of the interface or endpoint.
- **data** – The data buffer that sends the data in the optional data stage of the control transfer.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

vxi_command_query (`session, mode, command`)

Sends the device a miscellaneous command or query and/or retrieves the response to a previous query.

Corresponds to viVxiCommandQuery function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **mode** – Specifies whether to issue a command and/or retrieve a response. (Constants.VI_VXI_CMD*, .VI_VXI_RESP*)
- **command** – The miscellaneous command to send.

Returns The response retrieved from the device, return value of the library call.

Return type int, `pyvisa.constants.StatusCode`

wait_on_event (`session, in_event_type, timeout`)

Waits for an occurrence of the specified event for a given session.

Corresponds to viWaitOnEvent function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds.

Returns

- Logical identifier of the event actually received
- A handle specifying the unique occurrence of an event

- return value of the library call.

Return type

- eventtype
- event
- `pyvisa.constants.StatusCode`

write(*session, data*)

Writes data to device or interface synchronously.

Corresponds to viWrite function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **data** (*str*) – data to be written.

Returns Number of bytes actually transferred, return value of the library call.

Return type int, `pyvisa.constants.StatusCode`

write_asynchronously(*session, data*)

Writes data to device or interface asynchronously.

Corresponds to viWriteAsync function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **data** – data to be written.

Returns Job ID of this asynchronous write operation, return value of the library call.

Return type jobid, `pyvisa.constants.StatusCode`

write_from_file(*session, filename, count*)

Take data from a file and write it out synchronously.

Corresponds to viWriteFromFile function of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **filename** – Name of file from which data will be read.
- **count** – Number of bytes to be written.

Returns Number of bytes actually transferred, return value of the library call.

Return type int, `pyvisa.constants.StatusCode`

write_memory(*session, space, offset, data, width, extended=False*)

Write in an 8-bit, 16-bit, 32-bit, value to the specified memory space and offset.

Corresponds to viOut* functions of the VISA library.

Parameters

- **session** – Unique logical identifier to a session.
- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.

- **data** – Data to write to bus.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns return value of the library call.

Return type `pyvisa.constants.StatusCode`

3.6.2 Resource Manager

```
class pyvisa.highlevel.ResourceInfo(interface_type, interface_board_number, resource_class, resource_name, alias)
```

Resource extended information

Named tuple with information about a resource. Returned by some ResourceManager methods.

Interface_type Interface type of the given resource string.
`pyvisa.constants.InterfaceType`

Interface_board_number Board number of the interface of the given resource string.

Resource_class Specifies the resource class (for example, “INSTR”) of the given resource string.

Resource_name This is the expanded version of the given resource string. The format should be similar to the VISA-defined canonical resource name.

Alias Specifies the user-defined alias for the given resource string.

```
class pyvisa.highlevel.ResourceManager
```

VISA Resource Manager

Parameters **visa_library** – VisaLibrary Instance, path of the VISA library or VisaLibrary spec string. (if not given, the default for the platform will be used).

close()

Close the resource manager session.

last_status

Last status code returned for an operation with this Resource Manager

Return type `pyvisa.constants.StatusCode`

list_resources (`query=u'?**:INSTR'`)

Returns a tuple of all connected devices matching query.

Parameters **query** – regular expression used to match devices.

list_resources_info (`query=u'?**:INSTR'`)

Returns a dictionary mapping resource names to resource extended information of all connected devices matching query.

Parameters **query** – regular expression used to match devices.

Returns Mapping of resource name to ResourceInfo

Return type `dict[str, pyvisa.highlevel.ResourceInfo]`

open_bare_resource (`resource_name, access_mode=<AccessModes.no_lock: 0>, open_timeout=0`)

Open the specified resource without wrapping into a class

Parameters

- **resource_name** – name or alias of the resource to open.
- **access_mode** (`pyvisa.constants.AccessModes`) – access mode.
- **open_timeout** – time out to open.

Returns Unique logical identifier reference to a session.

open_resource (`resource_name, access_mode=<AccessModes.no_lock: 0>, open_timeout=0, resource_pyclass=None, **kwargs`)

Return an instrument for the resource name.

Parameters

- **resource_name** – name or alias of the resource to open.
- **access_mode** (`pyvisa.constants.AccessModes`) – access mode.
- **open_timeout** – time out to open.
- **resource_pyclass** – resource python class to use to instantiate the Resource. Defaults to None: select based on the resource name.
- **kwargs** – keyword arguments to be used to change instrument attributes after construction.

Return type `pyvisa.resources.Resource`

resource_info (`resource_name, extended=True`)

Get the (extended) information of a particular resource.

Parameters `resource_name` – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

session

Resource Manager session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

3.6.3 Resource classes

Resources are high level abstractions to managing specific sessions. An instance of one of these classes is returned by the `open_resource()` depending on the resource type.

Generic classes

- `Resource`
- `MessageBasedResource`
- `RegisterBasedResource`

Specific Classes

- `SerialInstrument`
- `TCP/IPInstrument`
- `TCP/PSocket`
- `USBInstrument`

- *USBRaw*
- *GPIBInstrument*
- *GPIBInterface*
- *FirewireInstrument*
- *PXIInstrument*
- *PXIInstrument*
- *VXIInstrument*
- *VXIMemory*
- *VXIBackplane*

class `pyvisa.resources.Resource(resource_manager, resource_name)`
Base class for resources.

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

Parameters

- **resource_manager** – A resource manager instance.
- **resource_name** – the VISA name for the resource (eg. “GPIB::10”)

before_close()

Called just before closing an instrument.

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

disable_event(event_type, mechanism)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events(event_type, mechanism)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event(event_type, mechanism, context=None)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)

- **context** – Not currently used, leave as None.

get_visa_attribute(*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning(**warnings_constants*)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute **VI_ATTR_RSRC_IMPL_VERSION** (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler(*event_type*, *handler*, *user_handle=None*)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute **VI_ATTR_INTF_NUM** (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

last_status

Last status code for this session.

Return type *pyvisa.constants.StatusCode*

lock(*timeout=u'default'*, *requested_key=None*)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

`lock_context (*args, **kwds)`

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

`lock_excl (timeout=u'default')`

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

`lock_state`

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

`open (access_mode=<AccessModes.no_lock: 0>, open_timeout=5000)`

Opens a session to the specified resource.

Parameters

- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (`int`) – Milliseconds before the open operation times out.

`classmethod register (interface_type, resource_class)`

`resource_class`

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

`resource_info`

Get the extended information of this resource.

Parameters **resource_name** – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

session

Resource session handle.

Raises pyvisa.errors.InvalidSession if session is closed.

set_visa_attribute(name, state)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

• **infinite (VI_TMO_INFINITE): float('+inf')** (for convenience, None is considered as float('+inf'))

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler (*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by install_handler.

unlock()

Relinquishes a lock for the specified resource.

visa_attributes_classes = [<class ‘pyvisa.attributes.AttrVI_ATTR_RM_SESSION’>, <class ‘pyvisa.attributes.AttrVI_ATTR_TCPIP_ADDRESS_LIST’>, <class ‘pyvisa.attributes.AttrVI_ATTR_GPIB_ADDRESS’>, <class ‘pyvisa.attributes.AttrVI_ATTR_TCPIP根本就不支持，所以无法继续翻译下去。建议直接使用英文版的文档。

wait_on_event (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.

class pyvisa.resources.MessageBasedResource (*args, **kwargs)

Base class for resources that use message based communication.

CR = u'\r'

LF = u'\n'

assert_trigger()

Sends a software trigger to the device.

before_close()

Called just before closing an instrument.

chunk_size = 20480

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

disable_event (*event_type*, *mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type*, *mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (*event_type*, *mechanism*, *context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

encoding

Encoding used for read and write operations.

get_visa_attribute (*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (**warnings_constants*)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (*event_type*, *handler*, *user_handle=None*)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (*timeout=u'default'*, *requested_key=None*)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (*timeout=u'default'*)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

open (*access_mode=<AccessModes.no_lock: 0>*, *open_timeout=5000*)

Opens a session to the specified resource.

Parameters

- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (`int`) – Milliseconds before the open operation times out.

query (`message, delay=None`)

A combination of write(`message`) and read()

Parameters

- **message** (`str`) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to `self.query_delay`

Returns the answer from the device.

Return type `str`

query_ascii_values (`message, converter=u'f', separator=u'', container=<type 'list'>, delay=None`)

Query the device for values in ascii format returning an iterable of values.

Parameters

- **message** (`str`) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to `self.query_delay`
- **converter** (`callable`) – function used to convert each element. Defaults to float
- **separator** – a callable that split the str into individual elements. If a str is given, `data.split(separator)` is used.
- **container** – container type to use for the output data.

Type separator: (str) -> collections.Iterable[int] | str

Returns the answer from the device.

Return type `list`

query_binary_values (`message, datatype=u'f', is_big_endian=False, container=<type 'list'>, delay=None, header_fmt=u'ieee'`)

Converts an iterable of numbers into a block of data in the ieee format.

Parameters

- **message** – the message to send to the instrument.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianess. Defaults to False.
- **container** – container type to use for the output data.
- **delay** – delay in seconds between write and read operations. if None, defaults to `self.query_delay`

Return type `bytes`

query_delay = 0.0

query_values (*message*, *delay=None*)
Query the device for values returning an iterable of values.
The datatype expected is obtained from *values_format*

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.**Return type** list

read (*termination=None*, *encoding=None*)
Read a string from the device.

Reading stops when the device stops sending (e.g. by setting appropriate bus lines), or the termination characters sequence was detected. Attention: Only the last character of the termination characters is really used to stop reading, however, the whole sequence is compared to the ending of the read string message. If they don't match, a warning is issued.

All line-ending characters are stripped from the end of the string.

Return type str

read_raw (*size=None*)
Read the unmodified string sent from the instrument to the computer.

In contrast to read(), no termination characters are stripped.

Return type bytes

read_stb()
Service request status register.

read_termination
Read termination character.

read_termination_context (*args, **kwds)

read_values (*fmt=None*, *container=<type 'list'>*)
Read a list of floating point values from the device.

Parameters

- **fmt** – the format of the values. If given, it overrides the class attribute “values_format”. Possible values are bitwise disjunctions of the above constants ascii, single, double, and big_endian. Default is ascii.
- **container** – the output datatype

Returns the list of read values**Return type** list

register (*interface_type*, *resource_class*)

resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

`resource_info`

Get the extended information of this resource.

Parameters `resource_name` – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

`resource_manufacturer_name`

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute `VI_ATTR_RSRC_MANF_NAME` (3221160308)

`resource_name`

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute `VI_ATTR_RSRC_NAME` (3221159938)

`session`

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

`set_visa_attribute(name, state)`

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

`spec_version`

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute `VI_ATTR_RSRC_SPEC_VERSION` (1073676656)

Type int

Range 0 <= value <= 4294967295

`stb`

Service request status register.

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

- infinite (VI_TMO_INFINITE):** float('+inf') (for convenience, None is considered as float('+inf'))

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler(*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
 - **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
 - **user_handle** – The user handle (ctypes object or None) returned by install_handler.

unlock ()

Relinquishes a lock for the specified resource.

values_format

```
visa_attributes_classes = [<class 'pyvisa.attributes.AttrVI_ATTR_RM_SESSION'>, <class 'pyvisa.attributes.AttrVI_ATTR_TCPIP_RIGID_HANDLE'>]
```

wait_on_event (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
 - **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
 - **capture_timeout** – When True will not produce a VisaiIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.

write (*message*, *termination*=None, *encoding*=None)

Write a string message to the device.

The write_termination is always appended to it.

Parameters `message` (`unicode` (Py2) or `str` (Py3)) – the message to be sent.

Returns number of bytes written.

Return type int

```
write_ascii_values(message, values, converter=u'f', separator=u',', termination=None, encoding=None)
```

Write a string message to the device followed by values in ascii format.

The write_termination is always appended to it.

Parameters

- **message** (*unicode (Py2) or str (Py3)*) – the message to be sent.
- **values** – data to be written to the device.
- **converter** (*callable | str*) – function used to convert each value. String formatting codes are also accepted. Defaults to str.
- **separator** – a callable that splits the str into individual elements. If a str is given, data.split(separator) is used.

Type separator: (collections.Iterable[T]) -> str | str

Returns number of bytes written.

Return type int

write_binary_values (*message, values, datatype=u'f', is_big_endian=False, termination=None, encoding=None*)

Write a string message to the device followed by values in binary format.

The write_termination is always appended to it.

Parameters

- **message** (*unicode (Py2) or str (Py3)*) – the message to be sent.
- **values** – data to be written to the device.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianness.

Returns number of bytes written.

Return type int

write_raw (*message*)

Write a byte message to the device.

Parameters **message** (*bytes*) – the message to be sent.

Returns number of bytes written.

Return type int

write_termination

Writer termination character.

write_values (*message, values, termination=None, encoding=None*)

class pyvisa.resources.RegisterBasedResource (*resource_manager, resource_name*)

Base class for resources that use register based communication.

before_close()

Called just before closing an instrument.

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

disable_event (*event_type, mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type*, *mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (*event_type*, *mechanism*, *context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

get_visa_attribute (*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (**warnings_constants*)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute **VI_ATTR_RSRC_IMPL_VERSION** (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (*event_type*, *handler*, *user_handle=None*)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.

- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (*timeout=u'default'*, *requested_key=None*)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (*timeout=u'default'*)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

`move_in` (*space, offset, length, width, extended=False*)

Moves a block of data to local memory from the specified address space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

`move_out` (*space, offset, length, data, width, extended=False*)

Moves a block of data from local memory to the specified address space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **data** – Data to write to bus.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

`open` (*access_mode=<AccessModes.no_lock: 0>, open_timeout=5000*)

Opens a session to the specified resource.

Parameters

- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (`int`) – Milliseconds before the open operation times out.

`read_memory` (*space, offset, width, extended=False*)

Reads in an 8-bit, 16-bit, 32-bit, or 64-bit value from the specified memory space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory.

Corresponds to viIn* functions of the visa library.

`register` (*interface_type, resource_class*)**`resource_class`**

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters `resource_name` – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

session

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute (name, state)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

- infinite (VI_TMO_INFINITE):** float('+inf') (for convenience, None is considered as float('+inf'))

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler(*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
 - **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
 - **user_handle** – The user handle (ctypes object or None) returned by install_handler.

`unlock()`

Relinquishes a lock for the specified resource.

```
visa_attributes_classes = [<class 'pyvisa.attributes.AttrVI_ATTR_RM_SESSION'>, <class 'pyvisa.attributes.AttrVI_ATTR_TCPIP_RIGID_HANDLE'>]
```

wait_on_event (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
 - **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
 - **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.

write_memory(*space*, *offset*, *data*, *width*, *extended=False*)

Write in an 8-bit, 16-bit, 32-bit, value to the specified memory space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
 - **offset** – Offset (in bytes) of the address or register from which to read.
 - **data** – Data to write to bus.
 - **width** – Number of bits to read.
 - **extended** – Use 64 bits offset independent of the platform.

Corresponds to `viOut*` functions of the `visa` library.

```
class pyvisa.resources.SerialInstrument(*args, **kwargs)
    Communicates with devices of type ASRL<board>[:INSTR]
```

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

`CR = u'\r'`

`LF = u'\n'`

`allow_dma`

This attribute specifies whether I/O accesses should use DMA (VI_TRUE) or Programmed I/O (VI_FALSE). In some implementations, this attribute may have global effects even though it is documented to be a local attribute. Since this affects performance and not functionality, that behavior is acceptable.

VISA Attribute VI_ATTR_DMA_ALLOW_EN (1073676318)

Type bool

`allow_transmit`

If set to VI_FALSE, it suspends transmission as if an XOFF character has been received. If set to VI_TRUE, it resumes transmission as if an XON character has been received.

VISA Attribute VI_ATTR_ASRL_ALLOW_TRANSMIT (1073676734)

Type bool

`assert_trigger()`

Sends a software trigger to the device.

`baud_rate`

VI_ATTR_ASRL_BAUD is the baud rate of the interface. It is represented as an unsigned 32-bit integer so that any baud rate can be used, but it usually requires a commonly used rate such as 300, 1200, 2400, or 9600 baud.

VISA Attribute VI_ATTR_ASRL_BAUD (1073676321)

Type int

Range 0 <= value <= 4294967295

`before_close()`

Called just before closing an instrument.

`break_length`

This controls the duration (in milliseconds) of the break signal asserted when VI_ATTR_ASRL_END_OUT is set to VI_ASRL_END_BREAK. If you want to control the assertion state and length of a break signal manually, use the VI_ATTR_ASRL_BREAK_STATE attribute instead.

VISA Attribute VI_ATTR_ASRL_BREAK_LEN (1073676733)

Type int

Range -32768 <= value <= 32767

`break_state`

If set to VI_STATE_ASSERTED, it suspends character transmission and places the transmission line in a break state until this attribute is reset to VI_STATE_UNASSERTED. This attribute lets you manually control the assertion state and length of a break signal. If you want VISA to send a break signal after each write operation automatically, use the VI_ATTR_ASRL_BREAK_LEN and VI_ATTR_ASRL_END_OUT attributes instead.

VISA Attribute VI_ATTR_ASRL_BREAK_STATE (1073676732)

Type :class:pyvisa.constants.LineState

bytes_in_buffer

VI_ATTR_ASRL_AVAIL_NUM shows the number of bytes available in the low-level I/O receive buffer.

VISA Attribute VI_ATTR_ASRL_AVAIL_NUM (1073676460)

Type int

Range 0 <= value <= 4294967295

chunk_size = 20480

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

data_bits

VI_ATTR_ASRL_DATA_BITS is the number of data bits contained in each frame (from 5 to 8).

The data bits for each frame are located in the low-order bits of every byte stored in memory.

VISA Attribute VI_ATTR_ASRL_DATA_BITS (1073676322)

Type int

Range 5 <= value <= 8

disable_event (*event_type, mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type, mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_null

If set to VI_TRUE, NUL characters are discarded. Otherwise, they are treated as normal data characters. For binary transfers, set this attribute to VI_FALSE.

VISA Attribute VI_ATTR_ASRL_DISCARD_NULL (1073676464)

Type bool

enable_event (*event_type*, *mechanism*, *context*=None)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

encoding

Encoding used for read and write operations.

end_input

VI_ATTR_ASRL_END_IN indicates the method used to terminate read operations.

VISA Attribute VI_ATTR_ASRL_END_IN (1073676467)

Type :class:pyvisa.constants.SerialTermination

flow_control

VI_ATTR_ASRL_FLOW_CNTRL indicates the type of flow control used by the transfer mechanism.

VISA Attribute VI_ATTR_ASRL_FLOW_CNTRL (1073676325)

Type int

Range 0 <= value <= 65535

flush (*mask*)

Manually clears the specified buffers and cause the buffer data to be written to the device.

Parameters **mask** – Specifies the action to be taken with flushing the buffer. (Constants.READ*, .WRITE*, .IO*)

get_visa_attribute (*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (*warnings_constants)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (*event_type*, *handler*, *user_handle*=None)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

io_protocol

VI_ATTR_IO_PROT specifies which protocol to use. In VXI, you can choose normal word serial or fast data channel (FDC). In GPIB, you can choose normal or high-speed (HS-488) transfers. In serial, TCPIP, or USB RAW, you can choose normal transfers or 488.2-defined strings. In USB INSTR, you can choose normal or vendor-specific transfers.

VISA Attribute VI_ATTR_IO_PROT (1073676316)

Type int

Range 0 <= value <= 65535

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (*timeout*=u'default', *requested_key*=None)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (timeout=u'default')

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

open (access_mode=<AccessModes.no_lock: 0>, open_timeout=5000)

Opens a session to the specified resource.

Parameters

- **access_mode** (*pyvisa.constants.AccessModes*) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (*int*) – Milliseconds before the open operation times out.

parity

VI_ATTR_ASRL_PARITY is the parity used with every frame transmitted and received.

VISA Attribute VI_ATTR_ASRL_PARITY (1073676323)

Type :class:pyvisa.constants.Parity

query (message, delay=None)

A combination of write(message) and read()

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type str

query_ascii_values(*message*, *converter*=u'f', *separator*=u', ', *container*=<type 'list'>, *delay*=None)

Query the device for values in ascii format returning an iterable of values.

Parameters

- **message** (str) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay
- **converter** (callable) – function used to convert each element. Defaults to float
- **separator** – a callable that split the str into individual elements. If a str is given, data.split(separator) is used.
- **container** – container type to use for the output data.

Type separator: (str) -> collections.Iterable[int] | str**Returns** the answer from the device.**Return type** list

query_binary_values(*message*, *datatype*=u'f', *is_big_endian*=False, *container*=<type 'list'>, *delay*=None, *header_fmt*=u'ieee')

Converts an iterable of numbers into a block of data in the ieee format.

Parameters

- **message** – the message to send to the instrument.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianess. Defaults to False.
- **container** – container type to use for the output data.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Return type bytes

query_delay = 0.0

query_values(*message*, *delay*=None)

Query the device for values returning an iterable of values.

The datatype expected is obtained from *values_format*

Parameters

- **message** (str) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.**Return type** list

read(*termination*=None, *encoding*=None)

Read a string from the device.

Reading stops when the device stops sending (e.g. by setting appropriate bus lines), or the termination characters sequence was detected. Attention: Only the last character of the termination characters is really

used to stop reading, however, the whole sequence is compared to the ending of the read string message. If they don't match, a warning is issued.

All line-ending characters are stripped from the end of the string.

Return type `str`

read_raw (`size=None`)

Read the unmodified string sent from the instrument to the computer.

In contrast to `read()`, no termination characters are stripped.

Return type `bytes`

read_stb()

Service request status register.

read_termination

Read termination character.

read_termination_context (*`args`, **`kwd`s)

read_values (`fmt=None`, `container=<type 'list'>`)

Read a list of floating point values from the device.

Parameters

- **fmt** – the format of the values. If given, it overrides the class attribute “values_format”. Possible values are bitwise disjunctions of the above constants ascii, single, double, and big_endian. Default is ascii.
- **container** – the output datatype

Returns the list of read values

Return type `list`

register (`interface_type`, `resource_class`)

replace_char

VI_ATTR_ASRL_REPLACE_CHAR specifies the character to be used to replace incoming characters that arrive with errors (such as parity error).

VISA Attribute `VI_ATTR_ASRL_REPLACE_CHAR` (1073676478)

Type `int`

Range `0 <= value <= 255`

resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute `VI_ATTR_RSRC_CLASS` (3221159937)

resource_info

Get the extended information of this resource.

Parameters `resource_name` – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

send_end

VI_ATTR_SEND_END_EN specifies whether to assert END during the transfer of the last byte of the buffer.

VISA Attribute VI_ATTR_SEND_END_EN (1073676310)

Type bool

session

Resource session handle.

Raises pyvisa.errors.InvalidSession if session is closed.

set_visa_attribute(name, state)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

stb

Service request status register.

stop_bits

VI_ATTR_ASRL_STOP_BITS is the number of stop bits used to indicate the end of a frame. The value VI_ASRL_STOP_ONE5 indicates one-and-one-half (1.5) stop bits.

VISA Attribute `VI_ATTR_ASRL_STOP_BITS` (1073676324)

Type :class:pyvisa.constants.StopBits

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

• **infinite** (VI_TMO_INFINITE): `float('+inf')` (for convenience, None is considered as `float('+inf')`)

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler (*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by `install_handler`.

unlock()

Relinquishes a lock for the specified resource.

values_format

visa_attributes_classes = [<class ‘pyvisa.attributes.AttrVI_ATTR_RM_SESSION’>, <class ‘pyvisa.attributes.AttrVI_ATTR_ASRL_STOP_BITS’>]

wait_on_event (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with `timed_out=True`

Returns A WaitResponse object that contains `event_type`, `context` and `ret` value.

write (*message*, *termination=None*, *encoding=None*)

Write a string message to the device.

The `write_termination` is always appended to it.

Parameters `message` (*unicode* (Py2) or *str* (Py3)) – the message to be sent.

Returns number of bytes written.

Return type int**write_ascii_values**(*message*, *values*, *converter*=u'f', *separator*=u', ', *termination*=None, *encoding*=None)

Write a string message to the device followed by values in ascii format.

The write_termination is always appended to it.

Parameters

- **message** (*unicode* (Py2) or *str* (Py3)) – the message to be sent.
- **values** – data to be written to the device.
- **converter** (*callable* | *str*) – function used to convert each value. String formatting codes are also accepted. Defaults to str.
- **separator** – a callable that splits the str into individual elements. If a str is given, *data.split(separator)* is used.

Type separator: (collections.Iterable[T]) -> str | str**Returns** number of bytes written.**Return type** int**write_binary_values**(*message*, *values*, *datatype*=u'f', *is_big_endian*=False, *termination*=None, *encoding*=None)

Write a string message to the device followed by values in binary format.

The write_termination is always appended to it.

Parameters

- **message** (*unicode* (Py2) or *str* (Py3)) – the message to be sent.
- **values** – data to be written to the device.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianness.

Returns number of bytes written.**Return type** int**write_raw**(*message*)

Write a byte message to the device.

Parameters **message** (*bytes*) – the message to be sent.**Returns** number of bytes written.**Return type** int**write_termination**

Writer termination character.

write_values(*message*, *values*, *termination*=None, *encoding*=None)**xoff_char**

VI_ATTR_ASRL_XOFF_CHAR specifies the value of the XOFF character used for XON/XOFF flow control (both directions). If XON/XOFF flow control (software handshaking) is not being used, the value of this attribute is ignored.

VISA Attribute VI_ATTR_ASRL_XOFF_CHAR (1073676482)

Type int

Range 0 <= value <= 255

xon_char

VI_ATTR_ASRL_XON_CHAR specifies the value of the XON character used for XON/XOFF flow control (both directions). If XON/XOFF flow control (software handshaking) is not being used, the value of this attribute is ignored.

VISA Attribute VI_ATTR_ASRL_XON_CHAR (1073676481)

Type int

Range 0 <= value <= 255

```
class pyvisa.resources.TCPIPInstrument(*args, **kwargs)
    Communicates with to devices of type TCPIP::host address[::INSTR]
```

More complex resource names can be specified with the following grammar: TCPIP[board]::host address[::LAN device name][::INSTR]

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

CR = u'\r'

LF = u'\n'

allow_dma

This attribute specifies whether I/O accesses should use DMA (VI_TRUE) or Programmed I/O (VI_FALSE). In some implementations, this attribute may have global effects even though it is documented to be a local attribute. Since this affects performance and not functionality, that behavior is acceptable.

VISA Attribute VI_ATTR_DMA_ALLOW_EN (1073676318)

Type bool

assert_trigger()

Sends a software trigger to the device.

before_close()

Called just before closing an instrument.

chunk_size = 20480

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

control_ren(mode)

Controls the state of the GPIB Remote Enable (REN) interface line, and optionally the remote/local state of the device.

Corresponds to viGpibControlREN function of the VISA library.

Parameters **mode** – Specifies the state of the REN line and optionally the device remote/local state. (Constants.GPIB_REN*)

Returns return value of the library call.

Return type VISAStatus

disable_event (*event_type*, *mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type*, *mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (*event_type*, *mechanism*, *context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

encoding

Encoding used for read and write operations.

get_visa_attribute (*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (**warnings_constants*)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (*event_type*, *handler*, *user_handle=None*)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

last_status

Last status code for this session.

Return type *pyvisa.constants.StatusCode*

lock (*timeout=u'default'*, *requested_key=None*)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (*timeout=u'default'*)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

open (*access_mode*=<AccessModes.no_lock: 0>, *open_timeout*=5000)

Opens a session to the specified resource.

Parameters

- **access_mode** (*pyvisa.constants.AccessModes*) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (*int*) – Milliseconds before the open operation times out.

query (*message*, *delay*=None)

A combination of write(*message*) and read()

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type *str*

query_ascii_values (*message*, *converter*=u'f', *separator*=u', ', *container*=<type 'list'>, *delay*=None)

Query the device for values in ascii format returning an iterable of values.

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay
- **converter** (*callable*) – function used to convert each element. Defaults to float
- **separator** – a callable that split the str into individual elements. If a str is given, data.split(separator) is used.
- **container** – container type to use for the output data.

Type separator: (str) -> collections.Iterable[int] | str

Returns the answer from the device.

Return type *list*

query_binary_values (*message*, *datatype*=u'f', *is_big_endian*=False, *container*=<type 'list'>, *delay*=None, *header_fmt*=u'ieee')

Converts an iterable of numbers into a block of data in the ieee format.

Parameters

- **message** – the message to send to the instrument.
- **datatype** – the format string for a single element. See struct module.

- **is_big_endian** – boolean indicating endianess. Defaults to False.
- **container** – container type to use for the output data.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Return type bytes

query_delay = 0.0

query_values (message, delay=None)

Query the device for values returning an iterable of values.

The datatype expected is obtained from *values_format*

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type list

read (termination=None, encoding=None)

Read a string from the device.

Reading stops when the device stops sending (e.g. by setting appropriate bus lines), or the termination characters sequence was detected. Attention: Only the last character of the termination characters is really used to stop reading, however, the whole sequence is compared to the ending of the read string message. If they don't match, a warning is issued.

All line-ending characters are stripped from the end of the string.

Return type str

read_raw (size=None)

Read the unmodified string sent from the instrument to the computer.

In contrast to read(), no termination characters are stripped.

Return type bytes

read_stb()

Service request status register.

read_termination

Read termination character.

read_termination_context (*args, **kwds)

read_values (fmt=None, container=<type 'list'>)

Read a list of floating point values from the device.

Parameters

- **fmt** – the format of the values. If given, it overrides the class attribute “values_format”. Possible values are bitwise disjunctions of the above constants ascii, single, double, and big_endian. Default is ascii.
- **container** – the output datatype

Returns the list of read values

Return type list

register(*interface_type*, *resource_class*)
resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters **resource_name** – Unique symbolic name of a resource.

Return type *pyvisa.highlevel.ResourceInfo*

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

send_end

VI_ATTR_SEND_END_EN specifies whether to assert END during the transfer of the last byte of the buffer.

VISA Attribute VI_ATTR_SEND_END_EN (1073676310)

Type bool

session

Resource session handle.

Raises *pyvisa.errors.InvalidSession* if session is closed.

set_visa_attribute(*name*, *state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute `VI_ATTR_RSRC_SPEC_VERSION` (1073676656)

Type int

Range 0 <= value <= 4294967295

stb

Service request status register.

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (`VI_TMO_IMMEDIATE`): 0

(for convenience, any value smaller than 1 is considered as 0)

- **infinite** (`VI_TMO_INFINITE`): `float('+inf')` (for convenience, None is considered as `float('+inf')`)

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler (*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by `install_handler`.

unlock()

Relinquishes a lock for the specified resource.

values_format

visa_attributes_classes = [<class ‘pyvisa.attributes.AttrVI_ATTR_RM_SESSION’>, <class ‘pyvisa.attributes.AttrVI_ATTR_RSRC_SPEC_VERSION’>]

wait_on_event (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with `timed_out=True`

Returns A WaitResponse object that contains event_type, context and ret value.

write (*message*, *termination=None*, *encoding=None*)

Write a string message to the device.

The write_termination is always appended to it.

Parameters **message** (*unicode* (Py2) or *str* (Py3)) – the message to be sent.

Returns number of bytes written.

Return type *int*

write_ascii_values (*message*, *values*, *converter=u'f'*, *separator=u','*, *termination=None*, *encoding=None*)

Write a string message to the device followed by values in ascii format.

The write_termination is always appended to it.

Parameters

- **message** (*unicode* (Py2) or *str* (Py3)) – the message to be sent.
- **values** – data to be written to the device.
- **converter** (*callable* | *str*) – function used to convert each value. String formatting codes are also accepted. Defaults to str.
- **separator** – a callable that splits the str into individual elements. If a str is given, *data.split(separator)* is used.

Type separator: (collections.Iterable[T]) -> str | str

Returns number of bytes written.

Return type *int*

write_binary_values (*message*, *values*, *datatype=u'f'*, *is_big_endian=False*, *termination=None*, *encoding=None*)

Write a string message to the device followed by values in binary format.

The write_termination is always appended to it.

Parameters

- **message** (*unicode* (Py2) or *str* (Py3)) – the message to be sent.
- **values** – data to be written to the device.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianess.

Returns number of bytes written.

Return type *int*

write_raw (*message*)

Write a byte message to the device.

Parameters **message** (*bytes*) – the message to be sent.

Returns number of bytes written.

Return type *int*

write_termination

Writer termination character.

write_values (*message*, *values*, *termination=None*, *encoding=None*)

class `pyvisa.resources.TCPIPSocket` (**args*, ***kwargs*)

Communicates with to devices of type TCPIP::host address::port::SOCKET

More complex resource names can be specified with the following grammar: TCPIP[board]::host address::port::SOCKET ad-

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

CR = u'\r'

LF = u'\n'

assert_trigger()

Sends a software trigger to the device.

before_close()

Called just before closing an instrument.

chunk_size = 20480

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

disable_event (*event_type*, *mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type*, *mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (*event_type*, *mechanism*, *context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

encoding

Encoding used for read and write operations.

get_visa_attribute (*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning(*warnings_constants)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler(event_type, handler, user_handle=None)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

io_protocol

VI_ATTR_IO_PROT specifies which protocol to use. In VXI, you can choose normal word serial or fast data channel (FDC). In GPIB, you can choose normal or high-speed (HS-488) transfers. In serial, TCPIP, or USB RAW, you can choose normal transfers or 488.2-defined strings. In USB INSTR, you can choose normal or vendor-specific transfers.

VISA Attribute VI_ATTR_IO_PROT (1073676316)

Type int

Range 0 <= value <= 65535

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (`timeout=u'default'`, `requested_key=None`)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (`timeout=u'default'`)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

open (`access_mode=<AccessModes.no_lock: 0>`, `open_timeout=5000`)

Opens a session to the specified resource.

Parameters

- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (`int`) – Milliseconds before the open operation times out.

query (`message`, `delay=None`)

A combination of write(message) and read()

Parameters

- **message** (`str`) – the message to send.

- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type str

query_ascii_values(message, converter=u'f', separator=u', ', container=<type 'list'>, delay=None)

Query the device for values in ascii format returning an iterable of values.

Parameters

- **message** (str) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay
- **converter** (callable) – function used to convert each element. Defaults to float
- **separator** – a callable that split the str into individual elements. If a str is given, data.split(separator) is used.
- **container** – container type to use for the output data.

Type separator: (str) -> collections.Iterable[int] | str

Returns the answer from the device.

Return type list

query_binary_values(message, datatype=u'f', is_big_endian=False, container=<type 'list'>, delay=None, header_fmt=u'ieee')

Converts an iterable of numbers into a block of data in the ieee format.

Parameters

- **message** – the message to send to the instrument.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianess. Defaults to False.
- **container** – container type to use for the output data.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Return type bytes

query_delay = 0.0

query_values(message, delay=None)

Query the device for values returning an iterable of values.

The datatype expected is obtained from *values_format*

Parameters

- **message** (str) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type list

read(*termination=None, encoding=None*)

Read a string from the device.

Reading stops when the device stops sending (e.g. by setting appropriate bus lines), or the termination characters sequence was detected. Attention: Only the last character of the termination characters is really used to stop reading, however, the whole sequence is compared to the ending of the read string message. If they don't match, a warning is issued.

All line-ending characters are stripped from the end of the string.

Return type `str`

read_raw(*size=None*)

Read the unmodified string sent from the instrument to the computer.

In contrast to `read()`, no termination characters are stripped.

Return type `bytes`

read_stb()

Service request status register.

read_termination

Read termination character.

read_termination_context(*args, **kwds)

read_values(*fmt=None, container=<type 'list'>*)

Read a list of floating point values from the device.

Parameters

- **fmt** – the format of the values. If given, it overrides the class attribute “values_format”. Possible values are bitwise disjunctions of the above constants ascii, single, double, and big_endian. Default is ascii.
- **container** – the output datatype

Returns the list of read values

Return type `list`

register(*interface_type, resource_class*)

resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters `resource_name` – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

session

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute (*name, state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

stb

Service request status register.

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

• **infinite** (VI_TMO_INFINITE): `float('+inf')` (for convenience, None is considered as `float('+inf')`)

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler (*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by install_handler.

unlock()

Relinquishes a lock for the specified resource.

values_format

visa_attributes_classes = [<class ‘pyvisa.attributes.AttrVI_ATTR_RM_SESSION’>, <class ‘pyvisa.attributes.AttrVI_ATTR_TCPIP_ADDRESS_LIST’>, <class ‘pyvisa.attributes.AttrVI_ATTR_GPIB_ADDRESS’>, <class ‘pyvisa.attributes.AttrVI_ATTR_TCPIP根本就不支持，所以无法继续翻译。建议直接使用英文版的PyVISA文档。

wait_on_event (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.

write (*message*, *termination=None*, *encoding=None*)

Write a string message to the device.

The write_termination is always appended to it.

Parameters **message** (*unicode (Py2) or str (Py3)*) – the message to be sent.

Returns number of bytes written.

Return type *int*

write_ascii_values (*message*, *values*, *converter=u'f'*, *separator=u','*, *termination=None*, *encoding=None*)

Write a string message to the device followed by values in ascii format.

The write_termination is always appended to it.

Parameters

- **message** (*unicode (Py2) or str (Py3)*) – the message to be sent.
- **values** – data to be written to the device.
- **converter** (*callable | str*) – function used to convert each value. String formatting codes are also accepted. Defaults to str.
- **separator** – a callable that splits the str into individual elements. If a str is given, data.split(separator) is used.

Type separator: (collections.Iterable[T]) -> str | str

Returns number of bytes written.

Return type int

write_binary_values (message, values, datatype=u'f', is_big_endian=False, termination=None, encoding=None)

Write a string message to the device followed by values in binary format.

The write_termination is always appended to it.

Parameters

- **message** (unicode (Py2) or str (Py3)) – the message to be sent.
- **values** – data to be written to the device.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianess.

Returns number of bytes written.

Return type int

write_raw (message)

Write a byte message to the device.

Parameters **message** (bytes) – the message to be sent.

Returns number of bytes written.

Return type int

write_termination

Writer termination character.

write_values (message, values, termination=None, encoding=None)

class pyvisa.resources.USBInstrument (*args, **kwargs)

Communicates with devices of type USB::manufacturer ID::model code::serial number

More complex resource names can be specified with the following grammar: USB[board]::manufacturer ID::model code::serial number[:USB interface number][::INSTR]

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

CR = u'\r'

LF = u'\n'

assert_trigger()

Sends a software trigger to the device.

before_close()

Called just before closing an instrument.

chunk_size = 20480

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

control_in (request_type_bitmap_field, request_id, request_value, index, length=0)

Performs a USB control pipe transfer from the device.

Parameters

- **request_type_bitmap_field** – bmRequestType parameter of the setup stage of a USB control transfer.
- **request_id** – bRequest parameter of the setup stage of a USB control transfer.
- **request_value** – wValue parameter of the setup stage of a USB control transfer.
- **index** – wIndex parameter of the setup stage of a USB control transfer. This is usually the index of the interface or endpoint.
- **length** – wLength parameter of the setup stage of a USB control transfer. This value also specifies the size of the data buffer to receive the data from the optional data stage of the control transfer.

Returns The data buffer that receives the data from the optional data stage of the control transfer.

Return type bytes

control_ren (*mode*)

Controls the state of the GPIB Remote Enable (REN) interface line, and optionally the remote/local state of the device.

Corresponds to viGpibControlREN function of the VISA library.

Parameters **mode** – Specifies the state of the REN line and optionally the device remote/local state. (Constants.GPIB_REN*)

Returns return value of the library call.

Return type VISAStatus

disable_event (*event_type, mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type, mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (*event_type, mechanism, context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

encoding

Encoding used for read and write operations.

get_visa_attribute (name)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (*warnings_constants)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (event_type, handler, user_handle=None)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

io_protocol

VI_ATTR_IO_PROT specifies which protocol to use. In VXI, you can choose normal word serial or fast data channel (FDC). In GPIB, you can choose normal or high-speed (HS-488) transfers. In serial, TCPIP, or USB RAW, you can choose normal transfers or 488.2-defined strings. In USB INSTR, you can choose normal or vendor-specific transfers.

VISA Attribute VI_ATTR_IO_PROT (1073676316)

Type int

Range 0 <= value <= 65535

is_4882_compliant

VISA Attribute VI_ATTR_4882_COMPLIANT specifies whether the device is 488.2 compliant.

VISA Attribute VI_ATTR_4882_COMPLIANT (1073676703)

Type bool

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (*timeout=u'default'*, *requested_key=None*)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (*timeout=u'default'*)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

manufacturer_id

VI_ATTR_MANF_ID is the manufacturer identification number of the device.

VISA Attribute VI_ATTR_MANF_ID (1073676505)

Type int**Range** 0 <= value <= 65535**manufacturer_name**

This string attribute is the manufacturer name.

VISA Attribute VI_ATTR_MANF_NAME (3221160050)**maximum_interrupt_size****VI_ATTR_USB_MAX_INTR_SIZE** specifies the maximum size of data that will be stored by any given USB interrupt. If a USB interrupt contains more data than this size, the data in excess of this size will be lost.**VISA Attribute** VI_ATTR_USB_MAX_INTR_SIZE (1073676719)**Type** int**Range** 0 <= value <= 65535**model_code**

VI_ATTR_MODEL_CODE specifies the model code for the device.

VISA Attribute VI_ATTR_MODEL_CODE (1073676511)**Type** int**Range** 0 <= value <= 65535**model_name**

This string attribute is the model name of the device.

VISA Attribute VI_ATTR_MODEL_NAME (3221160055)**open** (*access_mode=<AccessModes.no_lock: 0>*, *open_timeout=5000*)

Opens a session to the specified resource.

Parameters

- **access_mode** (*pyvisa.constants.AccessModes*) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (*int*) – Milliseconds before the open operation times out.

query (*message*, *delay=None*)A combination of write(*message*) and read()**Parameters**

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.**Return type** str**query_ascii_values** (*message*, *converter=u'f'*, *separator=u','*, *container=<type 'list'>*, *delay=None*)

Query the device for values in ascii format returning an iterable of values.

Parameters

- **message** (*str*) – the message to send.

- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay
- **converter** (*callable*) – function used to convert each element. Defaults to float
- **separator** – a callable that split the str into individual elements. If a str is given, data.split(separator) is used.
- **container** – container type to use for the output data.

Type separator: (str) -> collections.Iterable[int] | str

Returns the answer from the device.

Return type list

query_binary_values (*message*, *datatype=u'f'*, *is_big_endian=False*, *container=<type 'list'>*, *delay=None*, *header_fmt=u'ieee'*)

Converts an iterable of numbers into a block of data in the ieee format.

Parameters

- **message** – the message to send to the instrument.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianess. Defaults to False.
- **container** – container type to use for the output data.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Return type bytes

query_delay = 0.0

query_values (*message*, *delay=None*)

Query the device for values returning an iterable of values.

The datatype expected is obtained from *values_format*

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type list

read (*termination=None*, *encoding=None*)

Read a string from the device.

Reading stops when the device stops sending (e.g. by setting appropriate bus lines), or the termination characters sequence was detected. Attention: Only the last character of the termination characters is really used to stop reading, however, the whole sequence is compared to the ending of the read string message. If they don't match, a warning is issued.

All line-ending characters are stripped from the end of the string.

Return type str

read_raw(size=None)

Read the unmodified string sent from the instrument to the computer.

In contrast to read(), no termination characters are stripped.

Return type bytes

read_stb()

Service request status register.

read_termination

Read termination character.

read_termination_context(*args, **kwds)**read_values**(fmt=None, container=<type 'list'>)

Read a list of floating point values from the device.

Parameters

- **fmt** – the format of the values. If given, it overrides the class attribute “values_format”. Possible values are bitwise disjunctions of the above constants ascii, single, double, and big_endian. Default is ascii.
- **container** – the output datatype

Returns the list of read values

Return type list

register(interface_type, resource_class)**resource_class**

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters **resource_name** – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

send_end

VI_ATTR_SEND_END_EN specifies whether to assert END during the transfer of the last byte of the buffer.

VISA Attribute VI_ATTR_SEND_END_EN (1073676310)

Type bool

serial_number

VI_ATTR_USB_SERIAL_NUM specifies the USB serial number of this device.

VISA Attribute VI_ATTR_USB_SERIAL_NUM (3221160352)

session

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute (*name, state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

stb

Service request status register.

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

- **infinite (VI_TMO_INFINITE): float('+inf')** (for convenience, None is considered as float('+inf'))

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

`uninstall_handler(event_type, handler, user_handle=None)`

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by install_handler.

`unlock()`

Relinquishes a lock for the specified resource.

`usb_control_out(request_type_bitmap_field, request_id, request_value, index, data=u'')`

Performs a USB control pipe transfer to the device.

Parameters

- **request_type_bitmap_field** – bmRequestType parameter of the setup stage of a USB control transfer.
- **request_id** – bRequest parameter of the setup stage of a USB control transfer.
- **request_value** – wValue parameter of the setup stage of a USB control transfer.
- **index** – wIndex parameter of the setup stage of a USB control transfer. This is usually the index of the interface or endpoint.
- **data** – The data buffer that sends the data in the optional data stage of the control transfer.

`usb_protocol`

VI_ATTR_USB_PROTOCOL specifies the USB protocol used by this USB interface.

VISA Attribute VI_ATTR_USB_PROTOCOL (1073676711)

Type int

Range 0 <= value <= 255

`values_format`

`visa_attributes_classes = [<class 'pyvisa.attributes.AttrVI_ATTR_RM_SESSION'>, <class 'pyvisa.attributes.AttrVI_ATTR_USB_PROTOCOL'>]`

`wait_on_event(in_event_type, timeout, capture_timeout=False)`

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.

write (*message*, *termination=None*, *encoding=None*)

Write a string message to the device.

The write_termination is always appended to it.

Parameters **message** (*unicode* (Py2) or *str* (Py3)) – the message to be sent.

Returns number of bytes written.

Return type *int*

write_ascii_values (*message*, *values*, *converter=u'f'*, *separator=u','*, *termination=None*, *encoding=None*)

Write a string message to the device followed by values in ascii format.

The write_termination is always appended to it.

Parameters

- **message** (*unicode* (Py2) or *str* (Py3)) – the message to be sent.
- **values** – data to be written to the device.
- **converter** (*callable* | *str*) – function used to convert each value. String formatting codes are also accepted. Defaults to str.
- **separator** – a callable that splits the str into individual elements. If a str is given, data.split(separator) is used.

Type separator: (collections.Iterable[T]) -> str | str

Returns number of bytes written.

Return type *int*

write_binary_values (*message*, *values*, *datatype=u'f'*, *is_big_endian=False*, *termination=None*, *encoding=None*)

Write a string message to the device followed by values in binary format.

The write_termination is always appended to it.

Parameters

- **message** (*unicode* (Py2) or *str* (Py3)) – the message to be sent.
- **values** – data to be written to the device.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianness.

Returns number of bytes written.

Return type *int*

write_raw (*message*)

Write a byte message to the device.

Parameters **message** (*bytes*) – the message to be sent.

Returns number of bytes written.

Return type *int*

write_termination

Writer termination character.

write_values (*message*, *values*, *termination=None*, *encoding=None*)

```
class pyvisa.resources.USBRaw (*args, **kwargs)
    Communicates with to devices of type USB::manufacturer ID::model code::serial number::RAW

More complex resource names can be specified with the following grammar: USB[board]::manufacturer
ID::model code::serial number[:USB interface number]::RAW

Do not instantiate directly, use pyvisa.highlevel.ResourceManager.open_resource().

CR = u'\r'
LF = u'\n'

assert_trigger()
    Sends a software trigger to the device.

before_close()
    Called just before closing an instrument.

chunk_size = 20480

clear()
    Clears this resource

close()
    Closes the VISA session and marks the handle as invalid.

disable_event (event_type, mechanism)
    Disables notification of the specified event type(s) via the specified mechanism(s).
```

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (event_type, mechanism)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (event_type, mechanism, context=None)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

encoding

Encoding used for read and write operations.

get_visa_attribute (name)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)**Returns** The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (*warnings_constants)

Ignoring warnings context manager for the current resource.

Parameters `warnings_constants` – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (event_type, handler, user_handle=None)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

io_protocol

VI_ATTR_IO_PROT specifies which protocol to use. In VXI, you can choose normal word serial or fast data channel (FDC). In GPIB, you can choose normal or high-speed (HS-488) transfers. In serial, TCPIP, or USB RAW, you can choose normal transfers or 488.2-defined strings. In USB INSTR, you can choose normal or vendor-specific transfers.

VISA Attribute VI_ATTR_IO_PROT (1073676316)

Type int

Range 0 <= value <= 65535

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (`timeout=u'default'`, `requested_key=None`)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (`timeout=u'default'`)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute `VI_ATTR_RSRC_LOCK_STATE` (1073676292)

Type :class:pyvisa.constants.AccessModes

manufacturer_id

VI_ATTR_MANF_ID is the manufacturer identification number of the device.

VISA Attribute `VI_ATTR_MANF_ID` (1073676505)

Type int

Range 0 <= value <= 65535

manufacturer_name

This string attribute is the manufacturer name.

VISA Attribute `VI_ATTR_MANF_NAME` (3221160050)

maximum_interrupt_size

VI_ATTR_USB_MAX_INTR_SIZE specifies the maximum size of data that will be stored by any given USB interrupt. If a USB interrupt contains more data than this size, the data in excess of this size will be lost.

VISA Attribute VI_ATTR_USB_MAX_INTR_SIZE (1073676719)

Type int

Range 0 <= value <= 65535

model_code

VI_ATTR_MODEL_CODE specifies the model code for the device.

VISA Attribute VI_ATTR_MODEL_CODE (1073676511)

Type int

Range 0 <= value <= 65535

model_name

This string attribute is the model name of the device.

VISA Attribute VI_ATTR_MODEL_NAME (3221160055)

open (access_mode=<AccessModes.no_lock: 0>, open_timeout=5000)

Opens a session to the specified resource.

Parameters

- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (`int`) – Milliseconds before the open operation times out.

query (message, delay=None)

A combination of write(message) and read()

Parameters

- **message** (`str`) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type str

query_ascii_values (message, converter=u'f', separator=u', ', container=<type 'list'>, delay=None)

Query the device for values in ascii format returning an iterable of values.

Parameters

- **message** (`str`) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay
- **converter** (`callable`) – function used to convert each element. Defaults to float
- **separator** – a callable that split the str into individual elements. If a str is given, data.split(separator) is used.
- **container** – container type to use for the output data.

Type separator: (str) -> collections.Iterable[int] | str

Returns the answer from the device.

Return type list

query_binary_values (*message*, *datatype*=*u'f'*, *is_big_endian*=*False*, *container*=<type ‘list’>, *delay*=*None*, *header_fmt*=*u'ieee'*)

Converts an iterable of numbers into a block of data in the ieee format.

Parameters

- **message** – the message to send to the instrument.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianess. Defaults to False.
- **container** – container type to use for the output data.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Return type bytes

query_delay = 0.0

query_values (*message*, *delay*=*None*)

Query the device for values returning an iterable of values.

The datatype expected is obtained from *values_format*

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type list

read (*termination*=*None*, *encoding*=*None*)

Read a string from the device.

Reading stops when the device stops sending (e.g. by setting appropriate bus lines), or the termination characters sequence was detected. Attention: Only the last character of the termination characters is really used to stop reading, however, the whole sequence is compared to the ending of the read string message. If they don't match, a warning is issued.

All line-ending characters are stripped from the end of the string.

Return type str

read_raw (*size*=*None*)

Read the unmodified string sent from the instrument to the computer.

In contrast to read(), no termination characters are stripped.

Return type bytes

read_stb()

Service request status register.

read_termination

Read termination character.

read_termination_context (*args, **kwds)

read_values (*fmt=None, container=<type 'list'>*)

Read a list of floating point values from the device.

Parameters

- **fmt** – the format of the values. If given, it overrides the class attribute “values_format”. Possible values are bitwise disjunctions of the above constants ascii, single, double, and big_endian. Default is ascii.
- **container** – the output datatype

Returns the list of read values

Return type `list`

register (*interface_type, resource_class*)**resource_class**

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute `VI_ATTR_RSRC_CLASS` (3221159937)

resource_info

Get the extended information of this resource.

Parameters `resource_name` – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute `VI_ATTR_RSRC_MANF_NAME` (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute `VI_ATTR_RSRC_NAME` (3221159938)

serial_number

VI_ATTR_USB_SERIAL_NUM specifies the USB serial number of this device.

VISA Attribute `VI_ATTR_USB_SERIAL_NUM` (3221160352)

session

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute(*name, state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute **VI_ATTR_RSRC_SPEC_VERSION** (1073676656)

Type int

Range 0 <= value <= 4294967295

stb

Service request status register.

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

- **infinite** (VI_TMO_INFINITE): float('+inf') (for convenience, None is considered as float('+inf'))

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler(*event_type, handler, user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by install_handler.

unlock()

Relinquishes a lock for the specified resource.

usb_protocol

VI_ATTR_USB_PROTOCOL specifies the USB protocol used by this USB interface.

VISA Attribute **VI_ATTR_USB_PROTOCOL** (1073676711)

Type int

Range 0 <= value <= 255

```
values_format
visa_attributes_classes = [<class 'pyvisa.attributes.AttrVI_ATTR_RM_SESSION'>, <class 'pyvisa.attributes.AttrVI_ATTR_TCPIP_ADDRESS_LIST'>]
wait_on_event (in_event_type, timeout, capture_timeout=False)
    Waits for an occurrence of the specified event in this resource.

Parameters

- in_event_type – Logical identifier of the event(s) to wait for.
- timeout – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- capture_timeout – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.
```

```
write (message, termination=None, encoding=None)
    Write a string message to the device.
```

The write_termination is always appended to it.

Parameters **message** (*unicode (Py2) or str (Py3)*) – the message to be sent.

Returns number of bytes written.

Return type *int*

```
write_ascii_values (message, values, converter=u'f', separator=u',', termination=None, encoding=None)
    Write a string message to the device followed by values in ascii format.
```

The write_termination is always appended to it.

Parameters

- **message** (*unicode (Py2) or str (Py3)*) – the message to be sent.
- **values** – data to be written to the device.
- **converter** (*callable | str*) – function used to convert each value. String formatting codes are also accepted. Defaults to str.
- **separator** – a callable that splits the str into individual elements. If a str is given, data.split(separator) is used.

Type separator: (collections.Iterable[T]) -> str | str

Returns number of bytes written.

Return type *int*

```
write_binary_values (message, values, datatype=u'f', is_big_endian=False, termination=None, encoding=None)
    Write a string message to the device followed by values in binary format.
```

The write_termination is always appended to it.

Parameters

- **message** (*unicode (Py2) or str (Py3)*) – the message to be sent.
- **values** – data to be written to the device.
- **datatype** – the format string for a single element. See struct module.

- **is_big_endian** – boolean indicating endianess.

Returns number of bytes written.

Return type int

write_raw (*message*)
Write a byte message to the device.

Parameters **message** (*bytes*) – the message to be sent.

Returns number of bytes written.

Return type int

write_termination
Writer termination character.

write_values (*message*, *values*, *termination=None*, *encoding=None*)

class pyvisa.resources.GPIBInstrument (*args, **kwargs)
Communicates with to devices of type GPIB::<primary address>[::INSTR]

More complex resource names can be specified with the following grammar: GPIB[board]::primary address[::secondary address][::INSTR]

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

CR = u'\r'

LF = u'\n'

allow_dma

This attribute specifies whether I/O accesses should use DMA (VI_TRUE) or Programmed I/O (VI_FALSE). In some implementations, this attribute may have global effects even though it is documented to be a local attribute. Since this affects performance and not functionality, that behavior is acceptable.

VISA Attribute VI_ATTR_DMA_ALLOW_EN (1073676318)

Type bool

assert_trigger()
Sends a software trigger to the device.

before_close()
Called just before closing an instrument.

chunk_size = 20480

clear()
Clears this resource

close()
Closes the VISA session and marks the handle as invalid.

control_atn (*mode*)
Specifies the state of the ATN line and the local active controller state.
Corresponds to viGpibControlATN function of the VISA library.

Parameters **mode** – Specifies the state of the ATN line and optionally the local active controller state. (Constants.GPIB_ATN*)

Returns return value of the library call.

Return type VISAStatus

control_ren(*mode*)

Controls the state of the GPIB Remote Enable (REN) interface line, and optionally the remote/local state of the device.

Corresponds to viGpibControlREN function of the VISA library.

Parameters *mode* – Specifies the state of the REN line and optionally the device remote/local state. (Constants.GPIB_REN*)

Returns return value of the library call.

Return type VISAStatus

disable_event(*event_type*, *mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events(*event_type*, *mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event(*event_type*, *mechanism*, *context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

enable_repeat_addressing

VI_ATTR_GPIB_READR_EN specifies whether to use repeat addressing before each read or write operation.

VISA Attribute VI_ATTR_GPIB_READR_EN (1073676315)

Type bool

enable_unaddressing

VI_ATTR_GPIB_UNADDR_EN specifies whether to unaddress the device (UNT and UNL) after each read or write operation.

VISA Attribute VI_ATTR_GPIB_UNADDR_EN (1073676676)

Type bool

encoding

Encoding used for read and write operations.

get_visa_attribute (name)

Retrieves the state of an attribute in this resource.

Parameters `name` – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (*warnings_constants)

Ignoring warnings context manager for the current resource.

Parameters `warnings_constants` – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (event_type, handler, user_handle=None)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

io_protocol

VI_ATTR_IO_PROT specifies which protocol to use. In VXI, you can choose normal word serial or fast data channel (FDC). In GPIB, you can choose normal or high-speed (HS-488) transfers. In serial, TCPIP, or USB RAW, you can choose normal transfers or 488.2-defined strings. In USB INSTR, you can choose normal or vendor-specific transfers.

VISA Attribute VI_ATTR_IO_PROT (1073676316)

Type int

Range 0 <= value <= 65535

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (`timeout=u'default'`, `requested_key=None`)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (`timeout=u'default'`)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

open (`access_mode=<AccessModes.no_lock: 0>`, `open_timeout=5000`)

Opens a session to the specified resource.

Parameters

- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (`int`) – Milliseconds before the open operation times out.

pass_control(*primary_address*, *secondary_address*)

Tell the GPIB device at the specified address to become controller in charge (CIC).

Corresponds to viGpibPassControl function of the VISA library.

Parameters

- **primary_address** – Primary address of the GPIB device to which you want to pass control.
- **secondary_address** – Secondary address of the targeted GPIB device. If the targeted device does not have a secondary address, this parameter should contain the value Constants.NO_SEC_ADDR.

Returns return value of the library call.

Return type VISAStatus

primary_address

VI_ATTR_GPIB_PRIMARY_ADDR specifies the primary address of the GPIB device used by the given session. For the GPIB INTFC Resource, this attribute is Read-Write.

VISA Attribute VI_ATTR_GPIB_PRIMARY_ADDR (1073676658)

Type int

Range 0 <= value <= 30

query(*message*, *delay=None*)

A combination of write(*message*) and read()

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type str

query_ascii_values(*message*, *converter=u'f'*, *separator=u','*, *container=<type 'list'>*, *delay=None*)

Query the device for values in ascii format returning an iterable of values.

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay
- **converter** (*callable*) – function used to convert each element. Defaults to float
- **separator** – a callable that split the str into individual elements. If a str is given, data.split(separator) is used.
- **container** – container type to use for the output data.

Type separator: (str) -> collections.Iterable[int] | str

Returns the answer from the device.

Return type list

query_binary_values (*message*, *datatype*=*‘f’*, *is_big_endian*=*False*, *container*=*<type ‘list’>*, *delay*=*None*, *header_fmt*=*‘ieee’*)

Converts an iterable of numbers into a block of data in the ieee format.

Parameters

- **message** – the message to send to the instrument.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianess. Defaults to False.
- **container** – container type to use for the output data.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Return type bytes

query_delay = 0.0

query_values (*message*, *delay*=*None*)

Query the device for values returning an iterable of values.

The datatype expected is obtained from *values_format*

Parameters

- **message** (*str*) – the message to send.
- **delay** – delay in seconds between write and read operations. if None, defaults to self.query_delay

Returns the answer from the device.

Return type list

read (*termination*=*None*, *encoding*=*None*)

Read a string from the device.

Reading stops when the device stops sending (e.g. by setting appropriate bus lines), or the termination characters sequence was detected. Attention: Only the last character of the termination characters is really used to stop reading, however, the whole sequence is compared to the ending of the read string message. If they don't match, a warning is issued.

All line-ending characters are stripped from the end of the string.

Return type str

read_raw (*size*=*None*)

Read the unmodified string sent from the instrument to the computer.

In contrast to read(), no termination characters are stripped.

Return type bytes

read_stb ()

Service request status register.

read_termination

Read termination character.

read_termination_context (**args*, ***kwds*)

read_values (*fmt*=*None*, *container*=*<type ‘list’>*)

Read a list of floating point values from the device.

Parameters

- **fmt** – the format of the values. If given, it overrides the class attribute “values_format”. Possible values are bitwise disjunctions of the above constants ascii, single, double, and big_endian. Default is ascii.
- **container** – the output datatype

Returns the list of read values

Return type list

register (*interface_type*, *resource_class*)

remote_enabled

VI_ATTR_GPIB_REN_STATE returns the current state of the GPIB REN (Remote ENable) interface line.

VISA Attribute VI_ATTR_GPIB_REN_STATE (1073676673)

Type :class:pyvisa.constants.LineState

resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters **resource_name** – Unique symbolic name of a resource.

Return type pyvisa.highlevel.ResourceInfo

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

secondary_address

VI_ATTR_GPIB_SECONDARY_ADDR specifies the secondary address of the GPIB device used by the given session. For the GPIB INTFC Resource, this attribute is Read-Write.

VISA Attribute VI_ATTR_GPIB_SECONDARY_ADDR (1073676659)

Type int

Range 0 <= value <= 30 or in [65535]

send_command (*data*)

Write GPIB command bytes on the bus.

Corresponds to viGpibCommand function of the VISA library.

Parameters **data** (*bytes*) – data to write.

Returns Number of written bytes, return value of the library call.

Return type int, VISAStatus

send_end

VI_ATTR_SEND_END_EN specifies whether to assert END during the transfer of the last byte of the buffer.

VISA Attribute VI_ATTR_SEND_END_EN (1073676310)

Type bool

send_ifc ()

Pulse the interface clear line (IFC) for at least 100 microseconds.

Corresponds to viGpibSendIFC function of the VISA library.

Returns return value of the library call.

Return type VISAStatus

session

Resource session handle.

Raises pyvisa.errors.InvalidSession if session is closed.

set_visa_attribute (*name, state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

stb

Service request status register.

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

- **infinite (VI_TMO_INFINITE):** float('+inf') (for convenience, None is considered as float('+inf'))

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler(*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
 - **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
 - **user_handle** – The user handle (ctypes object or None) returned by install_handler.

unlock ()

Relinquishes a lock for the specified resource.

values format

```
visa_attributes_classes = [
```

wait for srq(timeout=25000)

Wait for a serial request (SRQ) coming from the instrument.

Note that this method is not ended when *another* instrument signals an SRQ, only *this* instrument.

Parameters `timeout` – the maximum waiting time in milliseconds. Default: 25000 (milliseconds). None means waiting forever if necessary.

wait on event (*in event type, timeout, capture timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
 - **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
 - **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed out=True

Returns A WaitResponse object that contains event type, context and ret value.

write (*message*, *termination*=None, *encoding*=None)

Write a string message to the device.

The write_termination is always appended to it.

Parameters `message` (`unicode` (Py2) or `str` (Py3)) – the message to be sent.

Returns number of bytes written.

Return type `int`

write_ascii_values (`message, values, converter=u'f', separator=u', ', termination=None, encoding=None`)

Write a string message to the device followed by values in ascii format.

The write_termination is always appended to it.

Parameters

- **message** (`unicode (Py2) or str (Py3)`) – the message to be sent.
- **values** – data to be written to the device.
- **converter** (`callable | str`) – function used to convert each value. String formatting codes are also accepted. Defaults to `str`.
- **separator** – a callable that splits the str into individual elements. If a str is given, `data.split(separator)` is used.

Type separator: (`collections.Iterable[T]`) -> `str | str`

Returns number of bytes written.

Return type `int`

write_binary_values (`message, values, datatype=u'f', is_big_endian=False, termination=None, encoding=None`)

Write a string message to the device followed by values in binary format.

The write_termination is always appended to it.

Parameters

- **message** (`unicode (Py2) or str (Py3)`) – the message to be sent.
- **values** – data to be written to the device.
- **datatype** – the format string for a single element. See struct module.
- **is_big_endian** – boolean indicating endianness.

Returns number of bytes written.

Return type `int`

write_raw (`message`)

Write a byte message to the device.

Parameters `message` (`bytes`) – the message to be sent.

Returns number of bytes written.

Return type `int`

write_termination

Writer termination character.

write_values (`message, values, termination=None, encoding=None`)

class `pyvisa.resources.GPIBInterface` (`resource_manager, resource_name`)

Communicates with devices of type GPIB::INTFC

More complex resource names can be specified with the following grammar: GPIB[board]::INTFC

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

address_state

This attribute shows whether the specified GPIB interface is currently addressed to talk or listen, or is not addressed.

VISA Attribute VI_ATTR_GPIB_ADDR_STATE (1073676380)

Type :class:pyvisa.constants.AddressState

allow_dma

This attribute specifies whether I/O accesses should use DMA (VI_TRUE) or Programmed I/O (VI_FALSE). In some implementations, this attribute may have global effects even though it is documented to be a local attribute. Since this affects performance and not functionality, that behavior is acceptable.

VISA Attribute VI_ATTR_DMA_ALLOW_EN (1073676318)

Type bool

atn_state

This attribute shows the current state of the GPIB ATN (ATtentioN) interface line.

VISA Attribute VI_ATTR_GPIB_ATN_STATE (1073676375)

Type :class:pyvisa.constants.LineState

before_close()

Called just before closing an instrument.

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

control_atn(mode)

Specifies the state of the ATN line and the local active controller state.

Corresponds to viGpibControlATN function of the VISA library.

Parameters **mode** – Specifies the state of the ATN line and optionally the local active controller state. (Constants.GPIB_ATN*)

Returns return value of the library call.

Return type VISAStatus

control_ren(mode)

Controls the state of the GPIB Remote Enable (REN) interface line, and optionally the remote/local state of the device.

Corresponds to viGpibControlREN function of the VISA library.

Parameters **mode** – Specifies the state of the REN line and optionally the device remote/local state. (Constants.GPIB_REN*)

Returns return value of the library call.

Return type VISAStatus

disable_event(event_type, mechanism)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type, mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (*event_type, mechanism, context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

get_visa_attribute (*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)**Returns** The state of the queried attribute for a specified resource.**Return type** unicode (Py2) or str (Py3), list or other type**group_execute_trigger** (**resources*)**ignore_warning** (**warnings_constants*)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.**implementation_version**

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)**Type** int**Range** 0 <= value <= 4294967295**install_handler** (*event_type, handler, user_handle=None*)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.

- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VISA Attribute VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

io_protocol

VI_ATTR_IO_PROT specifies which protocol to use. In VXI, you can choose normal word serial or fast data channel (FDC). In GPIB, you can choose normal or high-speed (HS-488) transfers. In serial, TCPIP, or USB RAW, you can choose normal transfers or 488.2-defined strings. In USB INSTR, you can choose normal or vendor-specific transfers.

VISA Attribute VI_ATTR_IO_PROT (1073676316)

Type int

Range 0 <= value <= 65535

is_controller_in_charge

This attribute shows whether the specified GPIB interface is currently CIC (Controller In Charge).

VISA Attribute VI_ATTR_GPIB_CIC_STATE (1073676382)

Type bool

is_system_controller

This attribute shows whether the specified GPIB interface is currently the system controller. In some implementations, this attribute may be modified only through a configuration utility. On these systems this attribute is read-only (RO).

VISA Attribute VI_ATTR_GPIB_SYS_CNTRL_STATE (1073676392)

Type bool

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (`timeout=u'default'`, `requested_key=None`)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (timeout=u'default')

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

ndac_state

This attribute shows the current state of the GPIB NDAC (Not Data ACcepted) interface line.

VISA Attribute VI_ATTR_GPIB_NDAC_STATE (1073676386)

Type :class:pyvisa.constants.LineState

open (access_mode=<AccessModes.no_lock: 0>, open_timeout=5000)

Opens a session to the specified resource.

Parameters

- **access_mode** (*pyvisa.constants.AccessModes*) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (*int*) – Milliseconds before the open operation times out.

pass_control (primary_address, secondary_address)

Tell the GPIB device at the specified address to become controller in charge (CIC).

Corresponds to viGpibPassControl function of the VISA library.

Parameters

- **primary_address** – Primary address of the GPIB device to which you want to pass control.

- **secondary_address** – Secondary address of the targeted GPIB device. If the targeted device does not have a secondary address, this parameter should contain the value Constants.NO_SEC_ADDR.

Returns return value of the library call.

Return type VISAStatus

primary_address

VI_ATTR_GPIB_PRIMARY_ADDR specifies the primary address of the GPIB device used by the given session. For the GPIB INTFC Resource, this attribute is Read-Write.

VISA Attribute VI_ATTR_GPIB_PRIMARY_ADDR (1073676658)

Type int

Range 0 <= value <= 30

register(*interface_type*, *resource_class*)

remote_enabled

VI_ATTR_GPIB_REN_STATE returns the current state of the GPIB REN (Remote ENable) interface line.

VISA Attribute VI_ATTR_GPIB_REN_STATE (1073676673)

Type :class:pyvisa.constants.LineState

resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters **resource_name** – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

secondary_address

VI_ATTR_GPIB_SECONDARY_ADDR specifies the secondary address of the GPIB device used by the given session. For the GPIB INTFC Resource, this attribute is Read-Write.

VISA Attribute VI_ATTR_GPIB_SECONDARY_ADDR (1073676659)

Type int

Range 0 <= value <= 30 or in [65535]

send_command (*data*)

Write GPIB command bytes on the bus.

Corresponds to viGpibCommand function of the VISA library.

Parameters **data** (*bytes*) – data to write.

Returns Number of written bytes, return value of the library call.

Return type int, VISAStatus

send_end

VI_ATTR_SEND_END_EN specifies whether to assert END during the transfer of the last byte of the buffer.

VISA Attribute VI_ATTR_SEND_END_EN (1073676310)

Type bool

send_ifc ()

Pulse the interface clear line (IFC) for at least 100 microseconds.

Corresponds to viGpibSendIFC function of the VISA library.

Returns return value of the library call.

Return type VISAStatus

session

Resource session handle.

Raises pyvisa.errors.InvalidSession if session is closed.

set_visa_attribute (*name, state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the

version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute `VI_ATTR_RSRC_SPEC_VERSION` (1073676656)

Type int

Range 0 <= value <= 4294967295

`timeout`

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (`VI_TMO_IMMEDIATE`): 0

(for convenience, any value smaller than 1 is considered as 0)

- **infinite** (`VI_TMO_INFINITE`): `float('+inf')` (for convenience, None is considered as `float('+inf')`)

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler (`event_type`, `handler`, `user_handle=None`)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by `install_handler`.

unlock()

Relinquishes a lock for the specified resource.

visa_attributes_classes = [<class ‘pyvisa.attributes.AttrVI_ATTR_RM_SESSION’>, <class ‘pyvisa.attributes.AttrVI_ATTR_TCPIP_RESOURCE_NAME’>]

wait_on_event (`in_event_type`, `timeout`, `capture_timeout=False`)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with `timed_out=True`

Returns A WaitResponse object that contains `event_type`, `context` and `ret` value.

class `pyvisa.resources.FirewireInstrument` (`resource_manager`, `resource_name`)

Communicates with to devices of type VXI::VXI logical address[::INSTR]

More complex resource names can be specified with the following grammar: VXI[board]::VXI logical address[::INSTR]

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

before_close()

Called just before closing an instrument.

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

disable_event(event_type, mechanism)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events(event_type, mechanism)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event(event_type, mechanism, context=None)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

get_visa_attribute(name)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning(*warnings_constants)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

`install_handler(event_type, handler, user_handle=None)`

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

`interface_number`

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

`interface_type`

The interface type of the resource as a number.

`last_status`

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

`lock(timeout=u'default', requested_key=None)`

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

`lock_context(*args, **kwds)`

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

`lock_excl(timeout=u'default')`

Establish an exclusive lock to the resource.

Parameters `timeout` – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

`lock_state`

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

`move_in` (*space, offset, length, width, extended=False*)

Moves a block of data to local memory from the specified address space and offset.

Parameters

- `space` – Specifies the address space. (Constants.*SPACE*)
- `offset` – Offset (in bytes) of the address or register from which to read.
- `length` – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- `width` – Number of bits to read per element.
- `extended` – Use 64 bits offset independent of the platform.

`move_out` (*space, offset, length, data, width, extended=False*)

Moves a block of data from local memory to the specified address space and offset.

Parameters

- `space` – Specifies the address space. (Constants.*SPACE*)
- `offset` – Offset (in bytes) of the address or register from which to read.
- `length` – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- `data` – Data to write to bus.
- `width` – Number of bits to read per element.
- `extended` – Use 64 bits offset independent of the platform.

`open` (*access_mode=<AccessModes.no_lock: 0>, open_timeout=5000*)

Opens a session to the specified resource.

Parameters

- `access_mode` (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- `open_timeout` (`int`) – Milliseconds before the open operation times out.

`read_memory` (*space, offset, width, extended=False*)

Reads in an 8-bit, 16-bit, 32-bit, or 64-bit value from the specified memory space and offset.

Parameters

- `space` – Specifies the address space. (Constants.*SPACE*)
- `offset` – Offset (in bytes) of the address or register from which to read.
- `width` – Number of bits to read.

- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory.

Corresponds to viIn* functions of the visa library.

register (*interface_type*, *resource_class*)

resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters **resource_name** – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

session

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute (*name*, *state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the

version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range $0 \leq \text{value} \leq 4294967295$

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

•infinite (VI_TMO_INFINITE): float('+inf') (for convenience, None is considered as float('+inf'))

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler(*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
 - **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
 - **user_handle** – The user handle (ctypes object or None) returned by install_handler.

unlock ()

Relinquishes a lock for the specified resource.

```
visa_attributes_classes = [<class 'pyvisa.attributes.AttrVI_ATTR_RM_SESSION'>, <class 'pyvisa.attributes.AttrVI_ATTR_TCPIP_RPORT'>]
```

wait_on_event (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
 - **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
 - **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.

write memory(*space*, *offset*, *data*, *width*, *extended=False*)

Write in an 8-bit, 16-bit, 32-bit, value to the specified memory space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
 - **offset** – Offset (in bytes) of the address or register from which to read.

- **data** – Data to write to bus.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Corresponds to viOut* functions of the visa library.

```
class pyvisa.resources.PXIInstrument(resource_manager, resource_name)
    Communicates with devices of type PXI::<device>[::INSTR]
```

More complex resource names can be specified with the following grammar:

PXI[bus]::device[::function][::INSTR]

or: PXI[interface]::bus-device[.function][::INSTR]

or: PXI[interface]::CHASSISchassis number::SLOTslot number[::FUNCfunction][::INSTR]

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

allow_dma

This attribute specifies whether I/O accesses should use DMA (VI_TRUE) or Programmed I/O (VI_FALSE). In some implementations, this attribute may have global effects even though it is documented to be a local attribute. Since this affects performance and not functionality, that behavior is acceptable.

VISA Attribute VI_ATTR_DMA_ALLOW_EN (1073676318)

Type bool

before_close()

Called just before closing an instrument.

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

destination_increment

VI_ATTR_DEST_INCREMENT is used in the viMoveOutXX() operations to specify by how many elements the destination offset is to be incremented after every transfer. The default value of this attribute is 1 (that is, the destination address will be incremented by 1 after each transfer), and the viMoveOutXX() operations move into consecutive elements. If this attribute is set to 0, the viMoveOutXX() operations will always write to the same element, essentially treating the destination as a FIFO register.

VISA Attribute VI_ATTR_DEST_INCREMENT (1073676353)

Type int

Range 0 <= value <= 1

disable_event(event_type, mechanism)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type*, *mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (*event_type*, *mechanism*, *context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

get_visa_attribute (*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (**warnings_constants*)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (*event_type*, *handler*, *user_handle=None*)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock(*timeout=u'default'*, *requested_key=None*)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context(*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl(*timeout=u'default'*)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

manufacturer_id

VI_ATTR_MANF_ID is the manufacturer identification number of the device.

VISA Attribute VI_ATTR_MANF_ID (1073676505)

Type int

Range 0 <= value <= 65535

manufacturer_name

This string attribute is the manufacturer name.

VISA Attribute VI_ATTR_MANF_NAME (3221160050)

model_code

VI_ATTR_MODEL_CODE specifies the model code for the device.

VISA Attribute VI_ATTR_MODEL_CODE (1073676511)

Type int

Range 0 <= value <= 65535

model_name

This string attribute is the model name of the device.

VISA Attribute VI_ATTR_MODEL_NAME (3221160055)

move_in (space, offset, length, width, extended=False)

Moves a block of data to local memory from the specified address space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

move_out (space, offset, length, data, width, extended=False)

Moves a block of data from local memory to the specified address space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **data** – Data to write to bus.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

open (access_mode=<AccessModes.no_lock: 0>, open_timeout=5000)

Opens a session to the specified resource.

Parameters

- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (`int`) – Milliseconds before the open operation times out.

read_memory (*space*, *offset*, *width*, *extended=False*)

Reads in an 8-bit, 16-bit, 32-bit, or 64-bit value from the specified memory space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory.

Corresponds to viIn* functions of the visa library.

register (*interface_type*, *resource_class*)**resource_class**

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters **resource_name** – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

session

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute (*name*, *state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
 - **state** – The state of the attribute to be set for the specified object.

source increment

VI_ATTR_SRC_INCREMENT is used in the viMoveInXX() operations to specify by how many elements the source offset is to be incremented after every transfer. The default value of this attribute is 1 (that is, the source address will be incremented by 1 after each transfer), and the viMoveInXX() operations move from consecutive elements. If this attribute is set to 0, the viMoveInXX() operations will always read from the same element, essentially treating the source as a FIFO register.

VISA Attribute VI ATTR SRC INCREMENT (1073676352)

Type int

Range $0 \leq \text{value} \leq 1$

spec version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI ATTR RSRC SPEC VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

- infinite (VI_TMO_INFINITE): float('+inf')** (for convenience, None is considered as float('+inf'))

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler(*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
 - **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
 - **user_handle** – The user handle (ctypes object or None) returned by install_handler.

unlock ()

Relinquishes a lock for the specified resource.

```
visa_attributes_classes = [<class 'pyvisa.attributes.AttrVI_ATTR_RM_SESSION'>, <class 'pyvisa.attributes.AttrVI_ATTR_TCPIP_RPORT'>]
```

`wait_on_event` (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.

`write_memory` (*space*, *offset*, *data*, *width*, *extended=False*)

Write in an 8-bit, 16-bit, 32-bit, value to the specified memory space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **data** – Data to write to bus.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Corresponds to viOut* functions of the visa library.

`class pyvisa.resources.PXIMemory` (*resource_manager*, *resource_name*)

Communicates with to devices of type PXI[interface]::MEMACC

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

`before_close()`

Called just before closing an instrument.

`clear()`

Clears this resource

`close()`

Closes the VISA session and marks the handle as invalid.

`destination_increment`

VI_ATTR_DEST_INCREMENT is used in the viMoveOutXX() operations to specify by how many elements the destination offset is to be incremented after every transfer. The default value of this attribute is 1 (that is, the destination address will be incremented by 1 after each transfer), and the viMoveOutXX() operations move into consecutive elements. If this attribute is set to 0, the viMoveOutXX() operations will always write to the same element, essentially treating the destination as a FIFO register.

VISA Attribute VI_ATTR_DEST_INCREMENT (1073676353)

Type int

Range 0 <= value <= 1

`disable_event` (*event_type*, *mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (event_type, mechanism)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (event_type, mechanism, context=None)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

get_visa_attribute (name)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (*warnings_constants)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (event_type, handler, user_handle=None)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.

- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (*timeout=u'default'*, *requested_key=None*)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (**args*, ***kwds*)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (*timeout=u'default'*)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

move_in (*space*, *offset*, *length*, *width*, *extended=False*)

Moves a block of data to local memory from the specified address space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

move_out (*space*, *offset*, *length*, *data*, *width*, *extended=False*)

Moves a block of data from local memory to the specified address space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **data** – Data to write to bus.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

open (*access_mode=<AccessModes.no_lock: 0>*, *open_timeout=5000*)

Opens a session to the specified resource.

Parameters

- **access_mode** (*pyvisa.constants.AccessModes*) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (*int*) – Milliseconds before the open operation times out.

read_memory (*space*, *offset*, *width*, *extended=False*)

Reads in an 8-bit, 16-bit, 32-bit, or 64-bit value from the specified memory space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory.

Corresponds to viIn* functions of the visa library.

register (*interface_type*, *resource_class*)

resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)**resource_info**

Get the extended information of this resource.

Parameters `resource_name` – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)**resource_name**

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)**session**

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute(name, state)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

source_increment

VI_ATTR_SRC_INCREMENT is used in the viMoveInXX() operations to specify by how many elements the source offset is to be incremented after every transfer. The default value of this attribute is 1 (that is, the source address will be incremented by 1 after each transfer), and the viMoveInXX() operations move from consecutive elements. If this attribute is set to 0, the viMoveInXX() operations will always read from the same element, essentially treating the source as a FIFO register.

VISA Attribute VI_ATTR_SRC_INCREMENT (1073676352)

Type int

Range 0 <= value <= 1

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

- **infinite (VI_TMO_INFINITE): float('+inf')** (for convenience, None is considered as float('+inf'))

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler (event_type, handler, user_handle=None)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by install_handler.

unlock ()

Relinquishes a lock for the specified resource.

visa_attributes_classes = [<class ‘pyvisa.attributes.AttrVI_ATTR_RM_SESSION’>, <class ‘pyvisa.attributes.AttrVI_ATTR_RSRC_SPEC_VERSION’>]

wait_on_event (in_event_type, timeout, capture_timeout=False)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.

write_memory (space, offset, data, width, extended=False)

Write in an 8-bit, 16-bit, 32-bit, value to the specified memory space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **data** – Data to write to bus.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Corresponds to viOut* functions of the visa library.

```
class pyvisa.resources.VXIInstrument (resource_manager, resource_name)
```

Communicates with devices of type VXI::VXI logical address[::INSTR]

More complex resource names can be specified with the following grammar: VXI[board]::VXI logical address[::INSTR]

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

allow_dma

This attribute specifies whether I/O accesses should use DMA (VI_TRUE) or Programmed I/O (VI_FALSE). In some implementations, this attribute may have global effects even though it is documented to be a local attribute. Since this affects performance and not functionality, that behavior is acceptable.

VISA Attribute VI_ATTR_DMA_ALLOW_EN (1073676318)

Type bool

before_close()

Called just before closing an instrument.

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

destination_increment

VI_ATTR_DEST_INCREMENT is used in the viMoveOutXX() operations to specify by how many elements the destination offset is to be incremented after every transfer. The default value of this attribute is 1 (that is, the destination address will be incremented by 1 after each transfer), and the viMoveOutXX() operations move into consecutive elements. If this attribute is set to 0, the viMoveOutXX() operations will always write to the same element, essentially treating the destination as a FIFO register.

VISA Attribute VI_ATTR_DEST_INCREMENT (1073676353)

Type int

Range 0 <= value <= 1

disable_event (*event_type*, *mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type*, *mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (*event_type*, *mechanism*, *context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

get_visa_attribute (*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (**warnings_constants*)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (*event_type*, *handler*, *user_handle=None*)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

io_protocol

VI_ATTR_IO_PROT specifies which protocol to use. In VXI, you can choose normal word serial or fast data channel (FDC). In GPIB, you can choose normal or high-speed (HS-488) transfers. In serial, TCPIP, or USB RAW, you can choose normal transfers or 488.2-defined strings. In USB INSTR, you can choose normal or vendor-specific transfers.

VISA Attribute VI_ATTR_IO_PROT (1073676316)

Type int

Range 0 <= value <= 65535

is_4882_compliant

VI_ATTR_4882_COMPLIANT specifies whether the device is 488.2 compliant.

VISA Attribute VI_ATTR_4882_COMPLIANT (1073676703)

Type bool

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock(*timeout=u'default'*, *requested_key=None*)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context(*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (*timeout=u'default'*)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

manufacturer_id

VI_ATTR_MANF_ID is the manufacturer identification number of the device.

VISA Attribute VI_ATTR_MANF_ID (1073676505)

Type int

Range 0 <= value <= 65535

manufacturer_name

This string attribute is the manufacturer name.

VISA Attribute VI_ATTR_MANF_NAME (3221160050)

model_code

VI_ATTR_MODEL_CODE specifies the model code for the device.

VISA Attribute VI_ATTR_MODEL_CODE (1073676511)

Type int

Range 0 <= value <= 65535

model_name

This string attribute is the model name of the device.

VISA Attribute VI_ATTR_MODEL_NAME (3221160055)

open (*access_mode=<AccessModes.no_lock: 0>*, *open_timeout=5000*)

Opens a session to the specified resource.

Parameters

- **access_mode** (*pyvisa.constants.AccessModes*) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (*int*) – Milliseconds before the open operation times out.

register (*interface_type*, *resource_class*)

resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters `resource_name` – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute `VI_ATTR_RSRC_MANF_NAME` (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute `VI_ATTR_RSRC_NAME` (3221159938)

send_end

VI_ATTR_SEND_END_EN specifies whether to assert END during the transfer of the last byte of the buffer.

VISA Attribute `VI_ATTR_SEND_END_EN` (1073676310)

Type bool

session

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute(*name, state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

source_increment

VI_ATTR_SRC_INCREMENT is used in the viMoveInXX() operations to specify by how many elements the source offset is to be incremented after every transfer. The default value of this attribute is 1 (that is, the source address will be incremented by 1 after each transfer), and the viMoveInXX() operations move from consecutive elements. If this attribute is set to 0, the viMoveInXX() operations will always read from the same element, essentially treating the source as a FIFO register.

VISA Attribute `VI_ATTR_SRC_INCREMENT` (1073676352)

Type int

Range 0 <= value <= 1

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute `VI_ATTR_RSRC_SPEC_VERSION` (1073676656)

Type int

Range 0 <= value <= 4294967295

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (`VI_TMO_IMMEDIATE`): 0

(for convenience, any value smaller than 1 is considered as 0)

- **infinite** (`VI_TMO_INFINITE`): `float('+inf')` (for convenience, None is considered as `float('+inf')`)

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler (*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by `install_handler`.

unlock()

Relinquishes a lock for the specified resource.

visa_attributes_classes = [<class ‘pyvisa.attributes.AttrVI_ATTR_RM_SESSION’>, <class ‘pyvisa.attributes.AttrVI_ATTR_RSRC_SPEC_VERSION’>]

wait_on_event (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with `timed_out=True`

Returns A WaitResponse object that contains `event_type`, `context` and `ret` value.

```
class pyvisa.resources.VXIMemory (resource_manager, resource_name)
    Communicates with devices of type VXI[board]::MEMACC
```

More complex resource names can be specified with the following grammar: VXI[board]::MEMACC

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

allow_dma

This attribute specifies whether I/O accesses should use DMA (VI_TRUE) or Programmed I/O (VI_FALSE). In some implementations, this attribute may have global effects even though it is documented to be a local attribute. Since this affects performance and not functionality, that behavior is acceptable.

VISA Attribute VI_ATTR_DMA_ALLOW_EN (1073676318)

Type bool

before_close()

Called just before closing an instrument.

clear()

Clears this resource

close()

Closes the VISA session and marks the handle as invalid.

destination_increment

VI_ATTR_DEST_INCREMENT is used in the viMoveOutXX() operations to specify by how many elements the destination offset is to be incremented after every transfer. The default value of this attribute is 1 (that is, the destination address will be incremented by 1 after each transfer), and the viMoveOutXX() operations move into consecutive elements. If this attribute is set to 0, the viMoveOutXX() operations will always write to the same element, essentially treating the destination as a FIFO register.

VISA Attribute VI_ATTR_DEST_INCREMENT (1073676353)

Type int

Range 0 <= value <= 1

disable_event (*event_type*, *mechanism*)

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

discard_events (*event_type*, *mechanism*)

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

enable_event (*event_type*, *mechanism*, *context=None*)

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

get_visa_attribute (*name*)

Retrieves the state of an attribute in this resource.

Parameters **name** – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

ignore_warning (**warnings_constants*)

Ignoring warnings context manager for the current resource.

Parameters **warnings_constants** – constants identifying the warnings to ignore.

implementation_version

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (*event_type*, *handler*, *user_handle=None*)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

last_status

Last status code for this session.

Return type `pyvisa.constants.StatusCode`

lock (*timeout=u'default'*, *requested_key=None*)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

lock_excl (*timeout=u'default'*)

Establish an exclusive lock to the resource.

Parameters **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

lock_state

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute VI_ATTR_RSRC_LOCK_STATE (1073676292)

Type :class:pyvisa.constants.AccessModes

move_in (*space*, *offset*, *length*, *width*, *extended=False*)

Moves a block of data to local memory from the specified address space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

move_out (*space*, *offset*, *length*, *data*, *width*, *extended=False*)

Moves a block of data from local memory to the specified address space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **length** – Number of elements to transfer, where the data width of the elements to transfer is identical to the source data width.
- **data** – Data to write to bus.
- **width** – Number of bits to read per element.
- **extended** – Use 64 bits offset independent of the platform.

open (*access_mode=<AccessModes.no_lock: 0>*, *open_timeout=5000*)

Opens a session to the specified resource.

Parameters

- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (`int`) – Milliseconds before the open operation times out.

read_memory (*space*, *offset*, *width*, *extended=False*)

Reads in an 8-bit, 16-bit, 32-bit, or 64-bit value from the specified memory space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Returns Data read from memory.

Corresponds to viIn* functions of the visa library.

register (*interface_type*, *resource_class*)

resource_class

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute VI_ATTR_RSRC_CLASS (3221159937)

resource_info

Get the extended information of this resource.

Parameters **resource_name** – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

resource_manufacturer_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_MANF_NAME (3221160308)

resource_name

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

session

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute (*name, state*)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

source_increment

VI_ATTR_SRC_INCREMENT is used in the viMoveInXX() operations to specify by how many elements the source offset is to be incremented after every transfer. The default value of this attribute is 1 (that is, the source address will be incremented by 1 after each transfer), and the viMoveInXX() operations move from consecutive elements. If this attribute is set to 0, the viMoveInXX() operations will always read from the same element, essentially treating the source as a FIFO register.

VISA Attribute VI_ATTR_SRC_INCREMENT (1073676352)

Type int

Range 0 <= value <= 1

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

- **infinite** (VI_TMO_INFINITE): `float('+inf')` (for convenience, None is considered as `float('+inf')`)

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler (*event_type*, *handler*, *user_handle=None*)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by `install_handler`.

unlock ()

Relinquishes a lock for the specified resource.

visa_attributes_classes = [<class ‘pyvisa.attributes.AttrVI_ATTR_RM_SESSION’>, <class ‘pyvisa.attributes.AttrVI_ATTR_TCPIP_RESOURCE_NAME’>]

wait_on_event (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with `timed_out=True`

Returns A WaitResponse object that contains `event_type`, `context` and `ret` value.

write_memory (*space*, *offset*, *data*, *width*, *extended=False*)

Write in an 8-bit, 16-bit, 32-bit, value to the specified memory space and offset.

Parameters

- **space** – Specifies the address space. (Constants.*SPACE*)
- **offset** – Offset (in bytes) of the address or register from which to read.
- **data** – Data to write to bus.
- **width** – Number of bits to read.
- **extended** – Use 64 bits offset independent of the platform.

Corresponds to viOut* functions of the visa library.

class pyvisa.resources.VXIBackplane (*resource_manager*, *resource_name*)

Communicates with to devices of type VXI::BACKPLANE

More complex resource names can be specified with the following grammar: VXI[board][::VXI logical address]::BACKPLANE

Do not instantiate directly, use `pyvisa.highlevel.ResourceManager.open_resource()`.

`before_close()`

Called just before closing an instrument.

`clear()`

Clears this resource

`close()`

Closes the VISA session and marks the handle as invalid.

`disable_event(event_type, mechanism)`

Disables notification of the specified event type(s) via the specified mechanism(s).

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be disabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

`discard_events(event_type, mechanism)`

Discards event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be discarded. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR, .VI_ALL_MECH)

`enable_event(event_type, mechanism, context=None)`

Enable event occurrences for specified event types and mechanisms in this resource.

Parameters

- **event_type** – Logical event identifier.
- **mechanism** – Specifies event handling mechanisms to be enabled. (Constants.VI_QUEUE, .VI_HNDLR, .VI_SUSPEND_HNDLR)
- **context** – Not currently used, leave as None.

`get_visa_attribute(name)`

Retrieves the state of an attribute in this resource.

Parameters `name` – Resource attribute for which the state query is made (see Attributes.*)

Returns The state of the queried attribute for a specified resource.

Return type unicode (Py2) or str (Py3), list or other type

`ignore_warning(*warnings_constants)`

Ignoring warnings context manager for the current resource.

Parameters `warnings_constants` – constants identifying the warnings to ignore.

`implementation_version`

VI_ATTR_RSRC_IMPL_VERSION is the resource version that uniquely identifies each of the different revisions or implementations of a resource. This attribute value is defined by the individual manufacturer and increments with each new revision. The format of the value has the upper 12 bits as

the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version.

VISA Attribute VI_ATTR_RSRC_IMPL_VERSION (1073676291)

Type int

Range 0 <= value <= 4294967295

install_handler (*event_type*, *handler*, *user_handle*=None)

Installs handlers for event callbacks in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be installed by a client application.
- **user_handle** – A value specified by an application that can be used for identifying handlers uniquely for an event type.

Returns user handle (a ctypes object)

interface_number

VI_ATTR_INTF_NUM specifies the board number for the given interface.

VISA Attribute VI_ATTR_INTF_NUM (1073676662)

Type int

Range 0 <= value <= 65535

interface_type

The interface type of the resource as a number.

last_status

Last status code for this session.

Return type *pyvisa.constants.StatusCode*

lock (*timeout*=u'default', *requested_key*=None)

Establish a shared lock to the resource.

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)
- **requested_key** – Access key used by another session with which you want your session to share a lock or None to generate a new shared access key.

Returns A new shared access key if requested_key is None, otherwise, same value as the requested_key

lock_context (*args, **kwds)

A context that locks

Parameters

- **timeout** – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

- **requested_key** – When using default of ‘exclusive’ the lock is an exclusive lock. Otherwise it is the access key for the shared lock or None to generate a new shared access key.

The returned context is the access_key if applicable.

`lock_excl(timeout=u'default')`

Establish an exclusive lock to the resource.

Parameters `timeout` – Absolute time period (in milliseconds) that a resource waits to get unlocked by the locking session before returning an error. (Defaults to self.timeout)

`lock_state`

VI_ATTR_RSRC_LOCK_STATE indicates the current locking state of the resource. The resource can be unlocked, locked with an exclusive lock, or locked with a shared lock.

VISA Attribute `VI_ATTR_RSRC_LOCK_STATE` (1073676292)

Type :class:pyvisa.constants.AccessModes

`open(access_mode=<AccessModes.no_lock: 0>, open_timeout=5000)`

Opens a session to the specified resource.

Parameters

- **access_mode** (`pyvisa.constants.AccessModes`) – Specifies the mode by which the resource is to be accessed.
- **open_timeout** (`int`) – Milliseconds before the open operation times out.

`register(interface_type, resource_class)`

`resource_class`

VI_ATTR_RSRC_CLASS specifies the resource class (for example, “INSTR”) as defined by the canonical resource name.

VISA Attribute `VI_ATTR_RSRC_CLASS` (3221159937)

`resource_info`

Get the extended information of this resource.

Parameters `resource_name` – Unique symbolic name of a resource.

Return type `pyvisa.highlevel.ResourceInfo`

`resource_manufacturer_name`

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute `VI_ATTR_RSRC_MANF_NAME` (3221160308)

`resource_name`

VI_ATTR_RSRC_MANF_NAME is a string that corresponds to the manufacturer name of the vendor that implemented the VISA library. This attribute is not related to the device manufacturer attributes.

Note The value of this attribute is for display purposes only and not for programmatic decisions, as the value can differ between VISA implementations and/or revisions.

VISA Attribute VI_ATTR_RSRC_NAME (3221159938)

session

Resource session handle.

Raises `pyvisa.errors.InvalidSession` if session is closed.

set_visa_attribute(name, state)

Sets the state of an attribute.

Parameters

- **name** – Attribute for which the state is to be modified. (Attributes.*)
- **state** – The state of the attribute to be set for the specified object.

spec_version

VI_ATTR_RSRC_SPEC_VERSION is the resource version that uniquely identifies the version of the VISA specification to which the implementation is compliant. The format of the value has the upper 12 bits as the major number of the version, the next lower 12 bits as the minor number of the version, and the lowest 8 bits as the sub-minor number of the version. The current VISA specification defines the value to be 00300000h.

VISA Attribute VI_ATTR_RSRC_SPEC_VERSION (1073676656)

Type int

Range 0 <= value <= 4294967295

timeout

The timeout in milliseconds for all resource I/O operations.

Special values: - **immediate** (VI_TMO_IMMEDIATE): 0

(for convenience, any value smaller than 1 is considered as 0)

- **infinite (VI_TMO_INFINITE): float('+inf')** (for convenience, None is considered as `float('+inf')`)

To set an **infinite** timeout, you can also use:

```
>>> del instrument.timeout
```

uninstall_handler(event_type, handler, user_handle=None)

Uninstalls handlers for events in this resource.

Parameters

- **event_type** – Logical event identifier.
- **handler** – Interpreted as a valid reference to a handler to be uninstalled by a client application.
- **user_handle** – The user handle (ctypes object or None) returned by `install_handler`.

unlock()

Relinquishes a lock for the specified resource.

```
visa_attributes_classes = [<class 'pyvisa.attributes.AttrVI_ATTR_RM_SESSION'>, <class 'pyvisa.attributes.At
```

`wait_on_event` (*in_event_type*, *timeout*, *capture_timeout=False*)

Waits for an occurrence of the specified event in this resource.

Parameters

- **in_event_type** – Logical identifier of the event(s) to wait for.
- **timeout** – Absolute time period in time units that the resource shall wait for a specified event to occur before returning the time elapsed error. The time unit is in milliseconds. None means waiting forever if necessary.
- **capture_timeout** – When True will not produce a VisaIOError(VI_ERROR_TMO) but instead return a WaitResponse with timed_out=True

Returns A WaitResponse object that contains event_type, context and ret value.

3.6.4 Constants module

Provides user-friendly naming to values used in different functions.

`class pyvisa.constants.AccessModes`**`exclusive_lock = None`**

Obtains a exclusive lock on the VISA resource.

`no_lock = None`

Does not obtain any lock on the VISA resource.

`shared_lock = None`

Obtains a lock on the VISA resource which may be shared between multiple VISA sessions.

`class pyvisa.constants.StopBits`

The number of stop bits that indicate the end of a frame.

`class pyvisa.constants.Parity`

The parity types to use with every frame transmitted and received on a serial session.

`class pyvisa.constants.SerialTermination`

The available methods for terminating a serial transfer.

`last_bit = None`

The transfer occurs with the last bit not set until the last character is sent.

`none = None`

The transfer terminates when all requested data is transferred or when an error occurs.

`termination_break = None`

The write transmits a break after all the characters for the write are sent.

`termination_char = None`

The transfer terminate by searching for “/” appending the termination character.

`class pyvisa.constants.InterfaceType`

The hardware interface

`asrl = None`

Serial devices connected to either an RS-232 or RS-485 controller.

`firewire = None`

Firewire device.

```
gpib = None
    GPIB Interface.

gpib_vxi = None
    GPIB VXI (VME eXtensions for Instrumentation).

pxi = None
    PXI device.

rio = None
    Rio device.

rsnrp = None
    Rohde and Schwarz Device via Passport

tcpip = None
    TCPIP device.

usb = None
    Universal Serial Bus (USB) hardware bus.

vxi = None
    VXI (VME eXtensions for Instrumentation), VME, MXI (Multisystem eXtension Interface).

class pyvisa.constants.AddressState
class pyvisa.constants.IOProtocol

fdc = None
    Fast data channel (FDC) protocol for VXI

hs488 = None
    High speed 488 transfer for GPIB

protocol4882_strs = None
    488 style transfer for serial

usbtmc_vendor = None
    Test measurement class vendor specific for USB

class pyvisa.constants.LineState
class pyvisa.constants.StatusCode
    Specifies the status codes that NI-VISA driver-level operations can return.

error_abort = None
    The operation was aborted.

error_allocation = None
    Insufficient system resources to perform necessary memory allocation.

error_attribute_read_only = None
    The specified attribute is read-only.

error_bus_error = None
    Bus error occurred during transfer.

error_closing_failed = None
    Unable to deallocate the previously allocated data structures corresponding to this session or object reference.

error_connection_lost = None
    The connection for the specified session has been lost.
```

error_file_access = None

An error occurred while trying to open the specified file. Possible causes include an invalid path or lack of access rights.

error_file_i_o = None

An error occurred while performing I/O on the specified file.

error_handler_not_installed = None

A handler is not currently installed for the specified event.

error_in_progress = None

Unable to queue the asynchronous operation because there is already an operation in progress.

error_input_protocolViolation = None

Device reported an input protocol error during transfer.

error_interface_number_not_configured = None

The interface type is valid but the specified interface number is not configured.

error_interrupt_pending = None

An interrupt is still pending from a previous call.

error_invalid_access_key = None

The access key to the resource associated with this session is invalid.

error_invalid_access_mode = None

Invalid access mode.

error_invalid_address_space = None

Invalid address space specified.

error_invalid_context = None

Specified event context is invalid.

error_invalid_degree = None

Specified degree is invalid.

error_invalid_event = None

Specified event type is not supported by the resource.

error_invalid_expression = None

Invalid expression specified for search.

error_invalid_format = None

A format specifier in the format string is invalid.

error_invalid_handler_reference = None

The specified handler reference is invalid.

error_invalid_job_id = None

Specified job identifier is invalid.

error_invalid_length = None

Invalid length specified.

error_invalid_line = None

The value specified by the line parameter is invalid.

error_invalid_lock_type = None

The specified type of lock is not supported by this resource.

error_invalid_mask = None

Invalid buffer mask specified.

error_invalid_mechanism = None
Invalid mechanism specified.

error_invalid_mode = None
The specified mode is invalid.

error_invalid_object = None
The specified session or object reference is invalid.

error_invalid_offset = None
Invalid offset specified.

error_invalid_parameter = None
The value of an unknown parameter is invalid.

error_invalid_protocol = None
The protocol specified is invalid.

error_invalid_resource_name = None
Invalid resource reference specified. Parsing error.

error_invalid_setup = None
Unable to start operation because setup is invalid due to inconsistent state of properties.

error_invalid_size = None
Invalid size of window specified.

error_invalid_width = None
Invalid source or destination width specified.

error_io = None
Could not perform operation because of I/O error.

error_library_not_found = None
A code library required by VISA could not be located or loaded.

error_line_in_use = None
The specified trigger line is currently in use.

error_machine_not_available = None
The remote machine does not exist or is not accepting any connections.

error_memory_not_shared = None
The device does not export any memory.

error_no_listeners = None
No listeners condition is detected (both NRFD and NDAC are deasserted).

error_no_permission = None
Access to the remote machine is denied.

error_nonimplemented_operation = None
The specified operation is unimplemented.

error_nonsupported_attribute = None
The specified attribute is not defined or supported by the referenced session, event, or find list.

error_nonsupported_attribute_state = None
The specified state of the attribute is not valid or is not supported as defined by the session, event, or find list.

error_nonsupported_format = None
A format specifier in the format string is not supported.

error_nonsupported_interrupt = None

The interface cannot generate an interrupt on the requested level or with the requested statusID value.

error_nonsupported_line = None

The specified trigger source line (trigSrc) or destination line (trigDest) is not supported by this VISA implementation, or the combination of lines is not a valid mapping.

error_nonsupported_mechanism = None

The specified mechanism is not supported for the specified event type.

error_nonsupported_mode = None

The specified mode is not supported by this VISA implementation.

error_nonsupported_offset = None

Specified offset is not accessible from this hardware.

error_nonsupported_offset_alignment = None

The specified offset is not properly aligned for the access width of the operation.

error_nonsupported_operation = None

The session or object reference does not support this operation.

error_nonsupported_varying_widths = None

Cannot support source and destination widths that are different.

error_nonsupported_width = None

Specified width is not supported by this hardware.

error_not_cic = None

The interface associated with this session is not currently the Controller-in-Charge.

error_not_enabled = None

The session must be enabled for events of the specified type in order to receive them.

error_not_system_controller = None

The interface associated with this session is not the system controller.

error_output_protocolViolation = None

Device reported an output protocol error during transfer.

error_queue_error = None

Unable to queue asynchronous operation.

error_queue_overflow = None

The event queue for the specified type has overflowed, usually due to not closing previous events.

error_raw_read_protocolViolation = None

Violation of raw read protocol occurred during transfer.

error_raw_write_protocolViolation = None

Violation of raw write protocol occurred during transfer.

error_resource_busy = None

The resource is valid, but VISA cannot currently access it.

error_resource_locked = None

Specified type of lock cannot be obtained or specified operation cannot be performed because the resource is locked.

error_resource_not_found = None

Insufficient location information, or the device or resource is not present in the system.

error_response_pending = None

A previous response is still pending, causing a multiple query error.

error_serial_framing = None
A framing error occurred during transfer.

error_serial_overrun = None
An overrun error occurred during transfer. A character was not read from the hardware before the next character arrived.

error_serial_parity = None
A parity error occurred during transfer.

error_session_not_locked = None
The current session did not have any lock on the resource.

error_srq_not_occurred = None
Service request has not been received for the session.

error_system_error = None
Unknown system error.

error_timeout = None
Timeout expired before operation completed.

error_trigger_not_mapped = None
The path from the trigger source line (trigSrc) to the destination line (trigDest) is not currently mapped.

error_user_buffer = None
A specified user buffer is not valid or cannot be accessed for the required size.

error_window_already_mapped = None
The specified session currently contains a mapped window.

error_window_not_mapped = None
The specified session is currently unmapped.

success = None
Operation completed successfully.

success_device_not_present = None
Session opened successfully, but the device at the specified address is not responding.

success_event_already_disabled = None
Specified event is already disabled for at least one of the specified mechanisms.

success_event_already_enabled = None
Specified event is already enabled for at least one of the specified mechanisms.

success_max_count_read = None
The number of bytes read is equal to the input count.

success_nested_exclusive = None
Operation completed successfully, and this session has nested exclusive locks.

success_nested_shared = None
Operation completed successfully, and this session has nested shared locks.

success_no_more_handler_calls_in_chain = None
Event handled successfully. Do not invoke any other handlers on this session for this event.

success_queue_already_empty = None
Operation completed successfully, but the queue was already empty.

success_queue_not_empty = None
Wait terminated successfully on receipt of an event notification. There is still at least one more event occurrence of the requested type(s) available for this session.

success_synchronous = None

Asynchronous operation request was performed synchronously.

success_termination_character_read = None

The specified termination character was read.

success_trigger_already_mapped = None

The path from the trigger source line (trigSrc) to the destination line (trigDest) is already mapped.

warning_configuration_not_loaded = None

The specified configuration either does not exist or could not be loaded. The VISA-specified defaults are used.

warning_ext_function_not_implemented = None

The operation succeeded, but a lower level driver did not implement the extended functionality.

warning_nonsupported_attribute_state = None

Although the specified state of the attribute is valid, it is not supported by this resource implementation.

warning_nonsupported_buffer = None

The specified buffer is not supported.

warning_null_object = None

The specified object reference is uninitialized.

warning_queue_overflow = None

VISA received more event information of the specified type than the configured queue size could hold.

warning_unknown_status = None

The status code passed to the operation could not be interpreted.

p

`pyvisa.constants`, 167

A

AccessModes (class in `pyvisa.constants`), 167
address_state (`pyvisa.resources.GPIBInterface` attribute), 126
AddressState (class in `pyvisa.constants`), 168
`allow_dma` (`pyvisa.resources.GPIBInstrument` attribute), 117
`allow_dma` (`pyvisa.resources.GPIBInterface` attribute), 127
`allow_dma` (`pyvisa.resources.PXIInstrument` attribute), 139
`allow_dma` (`pyvisa.resources.SerialInstrument` attribute), 74
`allow_dma` (`pyvisa.resources.TCPIPIInstrument` attribute), 84
`allow_dma` (`pyvisa.resources.VXIInstrument` attribute), 151
`allow_dma` (`pyvisa.resources.VXIMemory` attribute), 157
`allow_transmit` (`pyvisa.resources.SerialInstrument` attribute), 74
`asrl` (`pyvisa.constants.InterfaceType` attribute), 167
`assert_interrupt_signal()` (`pyvisa.highlevel.VisaLibraryBase` method), 32
`assert_trigger()` (`pyvisa.highlevel.VisaLibraryBase` method), 32
`assert_trigger()` (`pyvisa.resources.GPIBInstrument` method), 117
`assert_trigger()` (`pyvisa.resources.MessageBasedResource` method), 61
`assert_trigger()` (`pyvisa.resources.SerialInstrument` method), 74
`assert_trigger()` (`pyvisa.resources.TCPIPIInstrument` method), 84
`assert_trigger()` (`pyvisa.resources.TCPIPSocket` method), 92
`assert_trigger()` (`pyvisa.resources.USBInstrument` method), 99
`assert_trigger()` (`pyvisa.resources.USBRaw` method), 109
`assert_utility_signal()` (`pyvisa.highlevel.VisaLibraryBase` method), 33

`atn_state` (`pyvisa.resources.GPIBInterface` attribute), 127

B

`baud_rate` (`pyvisa.resources.SerialInstrument` attribute), 74
`before_close()` (`pyvisa.resources.FirewireInstrument` method), 133
`before_close()` (`pyvisa.resources.GPIBInstrument` method), 117
`before_close()` (`pyvisa.resources.GPIBInterface` method), 127
`before_close()` (`pyvisa.resources.MessageBasedResource` method), 61
`before_close()` (`pyvisa.resources.PXIInstrument` method), 139
`before_close()` (`pyvisa.resources.PXIMemory` method), 145
`before_close()` (`pyvisa.resources.RegisterBasedResource` method), 68
`before_close()` (`pyvisa.resources.Resource` method), 57
`before_close()` (`pyvisa.resources.SerialInstrument` method), 74
`before_close()` (`pyvisa.resources.TCPIPIInstrument` method), 84
`before_close()` (`pyvisa.resources.TCPIPSocket` method), 92
`before_close()` (`pyvisa.resources.USBInstrument` method), 99
`before_close()` (`pyvisa.resources.USBRaw` method), 109
`before_close()` (`pyvisa.resources.VXIBackplane` method), 163
`before_close()` (`pyvisa.resources.VXIInstrument` method), 151
`before_close()` (`pyvisa.resources.VXIMemory` method), 157
`break_length` (`pyvisa.resources.SerialInstrument` attribute), 74
`break_state` (`pyvisa.resources.SerialInstrument` attribute), 74
`buffer_read()` (`pyvisa.highlevel.VisaLibraryBase` method), 33

buffer_write() (pyvisa.highlevel.VisaLibraryBase method), 33
bytes_in_buffer (pyvisa.resources.SerialInstrument attribute), 75

C

chunk_size (pyvisa.resources.GPIBInstrument attribute), 117
chunk_size (pyvisa.resources.MessageBasedResource attribute), 61
chunk_size (pyvisa.resources.SerialInstrument attribute), 75
chunk_size (pyvisa.resources.TCPIPIInstrument attribute), 84
chunk_size (pyvisa.resources.TCPIPSocket attribute), 92
chunk_size (pyvisa.resources.USBInstrument attribute), 99
chunk_size (pyvisa.resources.USBRaw attribute), 109
clear() (pyvisa.highlevel.VisaLibraryBase method), 33
clear() (pyvisa.resources.FirewireInstrument method), 134
clear() (pyvisa.resources.GPIBInstrument method), 117
clear() (pyvisa.resources.GPIBInterface method), 127
clear() (pyvisa.resources.MessageBasedResource method), 61
clear() (pyvisa.resources.PXIInstrument method), 139
clear() (pyvisa.resources.PXIMemory method), 145
clear() (pyvisa.resources.RegisterBasedResource method), 68
clear() (pyvisa.resources.Resource method), 57
clear() (pyvisa.resources.SerialInstrument method), 75
clear() (pyvisa.resources.TCPIPIInstrument method), 84
clear() (pyvisa.resources.TCPIPSocket method), 92
clear() (pyvisa.resources.USBInstrument method), 99
clear() (pyvisa.resources.USBRaw method), 109
clear() (pyvisa.resources.VXIBackplane method), 163
clear() (pyvisa.resources.VXIInstrument method), 151
close() (pyvisa.resources.VXIMemory method), 157
control_atn() (pyvisa.resources.GPIBInstrument method), 117
control_atn() (pyvisa.resources.GPIBInterface method), 127
control_in() (pyvisa.resources.USBInstrument method), 99
control_ren() (pyvisa.resources.GPIBInstrument method), 118
control_ren() (pyvisa.resources.GPIBInterface method), 127
control_ren() (pyvisa.resources.TCPIPIInstrument method), 84
control_ren() (pyvisa.resources.USBInstrument method), 100
CR (pyvisa.resources.GPIBInstrument attribute), 117
CR (pyvisa.resources.MessageBasedResource attribute), 61
CR (pyvisa.resources.SerialInstrument attribute), 74
CR (pyvisa.resources.TCPIPIInstrument attribute), 84
CR (pyvisa.resources.TCPIPSocket attribute), 92
CR (pyvisa.resources.USBInstrument attribute), 99
CR (pyvisa.resources.USBRaw attribute), 109

D

data_bits (pyvisa.resources.SerialInstrument attribute), 75
destination_increment (pyvisa.resources.PXIInstrument attribute), 139
destination_increment (pyvisa.resources.PXIMemory attribute), 145
destination_increment (pyvisa.resources.VXIInstrument attribute), 151
destination_increment (pyvisa.resources.VXIMemory attribute), 157
disable_event() (pyvisa.highlevel.VisaLibraryBase method), 34
disable_event() (pyvisa.resources.FirewireInstrument method), 134
disable_event() (pyvisa.resources.GPIBInstrument method), 118
disable_event() (pyvisa.resources.GPIBInterface method), 127
disable_event() (pyvisa.resources.MessageBasedResource method), 61
disable_event() (pyvisa.resources.PXIInstrument method), 139
disable_event() (pyvisa.resources.PXIMemory method), 145
disable_event() (pyvisa.resources.RegisterBasedResource method), 68

disable_event() (pyvisa.resources.Resource method), 57
disable_event() (pyvisa.resources.SerialInstrument method), 75
disable_event() (pyvisa.resources.TCPIPIInstrument method), 85
disable_event() (pyvisa.resources.TCPIPSocket method), 92
disable_event() (pyvisa.resources.USBInstrument method), 100
disable_event() (pyvisa.resources.USBRaw method), 109
disable_event() (pyvisa.resources.VXIBackplane method), 163
disable_event() (pyvisa.resources.VXIInstrument method), 151
disable_event() (pyvisa.resources.VXIMemory method), 157
discard_events() (pyvisa.highlevel.VisaLibraryBase method), 34
discard_events() (pyvisa.resources.FirewireInstrument method), 134
discard_events() (pyvisa.resources.GPIBInstrument method), 118
discard_events() (pyvisa.resources.GPIBInterface method), 128
discard_events() (pyvisa.resources.MessageBasedResource method), 61
discard_events() (pyvisa.resources.PXIInstrument method), 139
discard_events() (pyvisa.resources.PXIMemory method), 146
discard_events() (pyvisa.resources.RegisterBasedResource method), 69
discard_events() (pyvisa.resources.Resource method), 57
discard_events() (pyvisa.resources.SerialInstrument method), 75
discard_events() (pyvisa.resources.TCPIPIInstrument method), 85
discard_events() (pyvisa.resources.TCPIPSocket method), 92
discard_events() (pyvisa.resources.USBInstrument method), 100
discard_events() (pyvisa.resources.USBRaw method), 109
discard_events() (pyvisa.resources.VXIBackplane method), 163
discard_events() (pyvisa.resources.VXIInstrument method), 151
discard_events() (pyvisa.resources.VXIMemory method), 157
discard_null (pyvisa.resources.SerialInstrument attribute), 75

E

enable_event() (pyvisa.highlevel.VisaLibraryBase method), 34
enable_event() (pyvisa.resources.FirewireInstrument method), 134
enable_event() (pyvisa.resources.GPIBInstrument method), 118
enable_event() (pyvisa.resources.GPIBInterface method), 128
enable_event() (pyvisa.resources.MessageBasedResource method), 62
enable_event() (pyvisa.resources.PXIInstrument method), 140
enable_event() (pyvisa.resources.PXIMemory method), 146
enable_event() (pyvisa.resources.RegisterBasedResource method), 69
enable_event() (pyvisa.resources.Resource method), 57
enable_event() (pyvisa.resources.SerialInstrument method), 76
enable_event() (pyvisa.resources.TCPIPIInstrument method), 85
enable_event() (pyvisa.resources.TCPIPSocket method), 92
enable_event() (pyvisa.resources.USBInstrument method), 100
enable_event() (pyvisa.resources.USBRaw method), 109
enable_event() (pyvisa.resources.VXIBackplane method), 163
enable_event() (pyvisa.resources.VXIInstrument method), 152
enable_event() (pyvisa.resources.VXIMemory method), 157
enable_repeat_addressing (pyvisa.resources.GPIBInstrument attribute), 118
enable_unaddressing (pyvisa.resources.GPIBInstrument attribute), 118
encoding (pyvisa.resources.GPIBInstrument attribute), 118
encoding (pyvisa.resources.MessageBasedResource attribute), 62
encoding (pyvisa.resources.SerialInstrument attribute), 76
encoding (pyvisa.resources.TCPIPIInstrument attribute), 85
encoding (pyvisa.resources.TCPIPSocket attribute), 92
encoding (pyvisa.resources.USBInstrument attribute), 100
encoding (pyvisa.resources.USBRaw attribute), 109
end_input (pyvisa.resources.SerialInstrument attribute), 76
EOI line, 13
error_abort (pyvisa.constants.StatusCode attribute), 168

error_allocation (pyvisa.constants.StatusCode attribute), 168
error_attribute_read_only (pyvisa.constants.StatusCode attribute), 168
error_bus_error (pyvisa.constants.StatusCode attribute), 168
error_closing_failed (pyvisa.constants.StatusCode attribute), 168
error_connection_lost (pyvisa.constants.StatusCode attribute), 168
error_file_access (pyvisa.constants.StatusCode attribute), 168
error_file_i_o (pyvisa.constants.StatusCode attribute), 169
error_handler_not_installed (pyvisa.constants.StatusCode attribute), 169
error_in_progress (pyvisa.constants.StatusCode attribute), 169
error_input_protocolViolation (pyvisa.constants.StatusCode attribute), 169
error_interface_number_not_configured (pyvisa.constants.StatusCode attribute), 169
error_interrupt_pending (pyvisa.constants.StatusCode attribute), 169
error_invalid_access_key (pyvisa.constants.StatusCode attribute), 169
error_invalid_access_mode (pyvisa.constants.StatusCode attribute), 169
error_invalid_address_space (pyvisa.constants.StatusCode attribute), 169
error_invalid_context (pyvisa.constants.StatusCode attribute), 169
error_invalid_degree (pyvisa.constants.StatusCode attribute), 169
error_invalid_event (pyvisa.constants.StatusCode attribute), 169
error_invalid_expression (pyvisa.constants.StatusCode attribute), 169
error_invalid_format (pyvisa.constants.StatusCode attribute), 169
error_invalid_handler_reference (pyvisa.constants.StatusCode attribute), 169
error_invalid_job_id (pyvisa.constants.StatusCode attribute), 169
error_invalid_length (pyvisa.constants.StatusCode attribute), 169
error_invalid_line (pyvisa.constants.StatusCode attribute), 169
error_invalid_lock_type (pyvisa.constants.StatusCode attribute), 169
error_invalid_mask (pyvisa.constants.StatusCode attribute), 169
error_invalid_mechanism (pyvisa.constants.StatusCode attribute), 169
error_invalid_mode (pyvisa.constants.StatusCode attribute), 170
error_invalid_object (pyvisa.constants.StatusCode attribute), 170
error_invalid_offset (pyvisa.constants.StatusCode attribute), 170
error_invalid_parameter (pyvisa.constants.StatusCode attribute), 170
error_invalid_protocol (pyvisa.constants.StatusCode attribute), 170
error_invalid_resource_name (pyvisa.constants.StatusCode attribute), 170
error_invalid_setup (pyvisa.constants.StatusCode attribute), 170
error_invalid_size (pyvisa.constants.StatusCode attribute), 170
error_invalid_width (pyvisa.constants.StatusCode attribute), 170
error_io (pyvisa.constants.StatusCode attribute), 170
error_library_not_found (pyvisa.constants.StatusCode attribute), 170
error_line_in_use (pyvisa.constants.StatusCode attribute), 170
error_machine_not_available (pyvisa.constants.StatusCode attribute), 170
error_memory_not_shared (pyvisa.constants.StatusCode attribute), 170
error_no_listeners (pyvisa.constants.StatusCode attribute), 170
error_no_permission (pyvisa.constants.StatusCode attribute), 170
error_nonimplemented_operation (pyvisa.constants.StatusCode attribute), 170
error_nonsupported_attribute (pyvisa.constants.StatusCode attribute), 170
error_nonsupported_attribute_state (pyvisa.constants.StatusCode attribute), 170
error_nonsupported_format (pyvisa.constants.StatusCode attribute), 170
error_nonsupported_interrupt (pyvisa.constants.StatusCode attribute), 170
error_nonsupported_line (pyvisa.constants.StatusCode attribute), 171
error_nonsupported_mechanism (pyvisa.constants.StatusCode attribute), 171
error_nonsupported_mode (pyvisa.constants.StatusCode attribute), 171
error_nonsupported_offset (pyvisa.constants.StatusCode attribute), 171
error_nonsupported_offset_alignment (pyvisa.constants.StatusCode attribute), 171
error_nonsupported_operation (pyvisa.constants.StatusCode attribute), 171

error_nonsupported_varying_widths
 (pyvisa.constants.StatusCode attribute), 171
 error_nonsupported_width (pyvisa.constants.StatusCode attribute), 171
 error_not_cic (pyvisa.constants.StatusCode attribute), 171
 error_not_enabled (pyvisa.constants.StatusCode attribute), 171
 error_not_system_controller
 (pyvisa.constants.StatusCode attribute), 171
 error_output_protocolViolation
 (pyvisa.constants.StatusCode attribute), 171
 error_queue_error (pyvisa.constants.StatusCode attribute), 171
 error_queue_overflow (pyvisa.constants.StatusCode attribute), 171
 error_raw_read_protocolViolation
 (pyvisa.constants.StatusCode attribute), 171
 error_raw_write_protocolViolation
 (pyvisa.constants.StatusCode attribute), 171
 error_resource_busy (pyvisa.constants.StatusCode attribute), 171
 error_resource_locked (pyvisa.constants.StatusCode attribute), 171
 error_resource_not_found (pyvisa.constants.StatusCode attribute), 171
 error_response_pending (pyvisa.constants.StatusCode attribute), 171
 error_serial_framing (pyvisa.constants.StatusCode attribute), 171
 error_serial_overrun (pyvisa.constants.StatusCode attribute), 172
 error_serial_parity (pyvisa.constants.StatusCode attribute), 172
 error_session_not_locked (pyvisa.constants.StatusCode attribute), 172
 error_srq_not_occurred (pyvisa.constants.StatusCode attribute), 172
 error_system_error (pyvisa.constants.StatusCode attribute), 172
 error_timeout (pyvisa.constants.StatusCode attribute), 172
 error_trigger_not_mapped (pyvisa.constants.StatusCode attribute), 172
 error_user_buffer (pyvisa.constants.StatusCode attribute), 172
 error_window_already_mapped
 (pyvisa.constants.StatusCode attribute), 172
 error_window_not_mapped (pyvisa.constants.StatusCode attribute), 172
 exclusive_lock (pyvisa.constants.AccessModes attribute), 167

F

fdc (pyvisa.constants.IOProtocol attribute), 168
 firewire (pyvisa.constants.InterfaceType attribute), 167
 FirewireInstrument (class in pyvisa.resources), 133
 flow_control (pyvisa.resources.SerialInstrument attribute), 76

flush() (pyvisa.highlevel.VisaLibraryBase method), 34
 flush() (pyvisa.resources.SerialInstrument method), 76

G

get_attribute() (pyvisa.highlevel.VisaLibraryBase method), 35
 get_debug_info() (pyvisa.highlevel.VisaLibraryBase static method), 35
 get_last_status_in_session()
 (pyvisa.highlevel.VisaLibraryBase method), 35
 get_library_paths() (pyvisa.highlevel.VisaLibraryBase static method), 35
 get_visa_attribute() (pyvisa.resources.FirewireInstrument method), 134
 get_visa_attribute() (pyvisa.resources.GPIBInstrument method), 119
 get_visa_attribute() (pyvisa.resources.GPIBInterface method), 128
 get_visa_attribute() (pyvisa.resources.MessageBasedResource method), 62
 get_visa_attribute() (pyvisa.resources.PXIInstrument method), 140
 get_visa_attribute() (pyvisa.resources.PXIMemory method), 146
 get_visa_attribute() (pyvisa.resources.RegisterBasedResource method), 69
 get_visa_attribute() (pyvisa.resources.Resource method), 58
 get_visa_attribute() (pyvisa.resources.SerialInstrument method), 76
 get_visa_attribute() (pyvisa.resources.TCPIPInstrument method), 85
 get_visa_attribute() (pyvisa.resources.TCPIPSocket method), 92
 get_visa_attribute() (pyvisa.resources.USBInstrument method), 100
 get_visa_attribute() (pyvisa.resources.USBRaw method), 109
 get_visa_attribute() (pyvisa.resources.VXIBackplane method), 163
 get_visa_attribute() (pyvisa.resources.VXIInstrument method), 152
 get_visa_attribute() (pyvisa.resources.VXIMemory method), 158
 gpib (pyvisa.constants.InterfaceType attribute), 167
 gpib_command() (pyvisa.highlevel.VisaLibraryBase method), 35

gpib_control_atn() (pyvisa.highlevel.VisaLibraryBase method), 35
gpib_control_ren() (pyvisa.highlevel.VisaLibraryBase method), 36
gpib_pass_control() (pyvisa.highlevel.VisaLibraryBase method), 36
gpib_send_ifc() (pyvisa.highlevel.VisaLibraryBase method), 36
gpib_vxi (pyvisa.constants.InterfaceType attribute), 168
GPIBInstrument (class in pyvisa.resources), 117
GPIBInterface (class in pyvisa.resources), 126
group_execute_trigger() (pyvisa.resources.GPIBInterface method), 128

H

handlers (pyvisa.highlevel.VisaLibraryBase attribute), 36
hs488 (pyvisa.constants.IOProtocol attribute), 168

I

ignore_warning() (pyvisa.highlevel.VisaLibraryBase method), 36
ignore_warning() (pyvisa.resources.FirewireInstrument method), 134
ignore_warning() (pyvisa.resources.GPIBInstrument method), 119
ignore_warning() (pyvisa.resources.GPIBInterface method), 128
ignore_warning() (pyvisa.resources.MessageBasedResource method), 62
ignore_warning() (pyvisa.resources.RegisterBasedResource method), 69
ignore_warning() (pyvisa.resources.Resource method), 58
ignore_warning() (pyvisa.resources.SerialInstrument method), 76
ignore_warning() (pyvisa.resources.TCPIPIInstrument method), 85
ignore_warning() (pyvisa.resources.TCPIPSocket method), 93
ignore_warning() (pyvisa.resources.USBInstrument method), 101
ignore_warning() (pyvisa.resources.USBRaw method), 110
ignore_warning() (pyvisa.resources.VXIBackplane method), 163
ignore_warning() (pyvisa.resources.VXIInstrument method), 152
ignore_warning() (pyvisa.resources.VXIMemory method), 158

implementation_version (pyvisa.resources.FirewireInstrument attribute), 134
implementation_version (pyvisa.resources.GPIBInstrument attribute), 119
implementation_version (pyvisa.resources.GPIBInterface attribute), 128
implementation_version (pyvisa.resources.MessageBasedResource attribute), 62
implementation_version (pyvisa.resources.PXIInstrument attribute), 140
implementation_version (pyvisa.resources.PXIMemory attribute), 146
implementation_version (pyvisa.resources.RegisterBasedResource attribute), 69
implementation_version (pyvisa.resources.Resource attribute), 58
implementation_version (pyvisa.resources.SerialInstrument attribute), 76
implementation_version (pyvisa.resources.TCPIPIInstrument attribute), 85
implementation_version (pyvisa.resources.TCPIPSocket attribute), 93
implementation_version (pyvisa.resources.USBInstrument attribute), 101
implementation_version (pyvisa.resources.USBRaw attribute), 110
implementation_version (pyvisa.resources.VXIBackplane attribute), 163
implementation_version (pyvisa.resources.VXIInstrument attribute), 152
implementation_version (pyvisa.resources.VXIMemory attribute), 158
in_16() (pyvisa.highlevel.VisaLibraryBase method), 37
in_32() (pyvisa.highlevel.VisaLibraryBase method), 37
in_64() (pyvisa.highlevel.VisaLibraryBase method), 37
in_8() (pyvisa.highlevel.VisaLibraryBase method), 37
install_handler() (pyvisa.highlevel.VisaLibraryBase method), 38
install_handler() (pyvisa.resources.FirewireInstrument method), 135
install_handler() (pyvisa.resources.GPIBInstrument method), 119
install_handler() (pyvisa.resources.GPIBInterface method), 128
install_handler() (pyvisa.resources.MessageBasedResource method), 62
install_handler() (pyvisa.resources.RegisterBasedResource method), 69
install_handler() (pyvisa.resources.PXIInstrument method), 140
install_handler() (pyvisa.resources.PXIMemory method), 146
install_handler() (pyvisa.resources.RegisterBasedResource method), 69
install_handler() (pyvisa.resources.Resource method), 58

install_handler() (pyvisa.resources.SerialInstrument method), 77
 install_handler() (pyvisa.resources.TCPIPIInstrument method), 85
 install_handler() (pyvisa.resources.TCPIPSocket method), 93
 install_handler() (pyvisa.resources.USBinstrument method), 101
 install_handler() (pyvisa.resources.USBRaw method), 110
 install_handler() (pyvisa.resources.VXIBackplane method), 164
 install_handler() (pyvisa.resources.VXIIInstrument method), 152
 install_handler() (pyvisa.resources.VXIMemory method), 158
 install_visa_handler() (pyvisa.highlevel.VisaLibraryBase method), 38
 interface_number (pyvisa.resources.FirewireInstrument attribute), 135
 interface_number (pyvisa.resources.GPIBInstrument attribute), 119
 interface_number (pyvisa.resources.GPIBInterface attribute), 129
 interface_number (pyvisa.resources.MessageBasedResource attribute), 63
 interface_number (pyvisa.resources.PXIIInstrument attribute), 140
 interface_number (pyvisa.resources.PXIMemory attribute), 147
 interface_number (pyvisa.resources.RegisterBasedResource attribute), 70
 interface_number (pyvisa.resources.Resource attribute), 58
 interface_number (pyvisa.resources.SerialInstrument attribute), 77
 interface_number (pyvisa.resources.TCPIPIInstrument attribute), 86
 interface_number (pyvisa.resources.TCPIPSocket attribute), 93
 interface_number (pyvisa.resources.USBinstrument attribute), 101
 interface_number (pyvisa.resources.USBRaw attribute), 110
 interface_number (pyvisa.resources.VXIBackplane attribute), 164
 interface_number (pyvisa.resources.VXIIInstrument attribute), 153
 interface_type (pyvisa.resources.GPIBInterface attribute), 129
 interface_type (pyvisa.resources.MessageBasedResource attribute), 63
 interface_type (pyvisa.resources.PXIIInstrument attribute), 141
 interface_type (pyvisa.resources.PXIMemory attribute), 147
 interface_type (pyvisa.resources.RegisterBasedResource attribute), 70
 interface_type (pyvisa.resources.Resource attribute), 58
 interface_type (pyvisa.resources.SerialInstrument attribute), 77
 interface_type (pyvisa.resources.TCPIPIInstrument attribute), 86
 interface_type (pyvisa.resources.TCPIPSocket attribute), 93
 interface_type (pyvisa.resources.USBinstrument attribute), 101
 interface_type (pyvisa.resources.USBRaw attribute), 110
 interface_type (pyvisa.resources.VXIBackplane attribute), 164
 interface_type (pyvisa.resources.VXIIInstrument attribute), 153
 InterfaceType (class in pyvisa.constants), 167
 io_protocol (pyvisa.resources.GPIBInstrument attribute), 119
 io_protocol (pyvisa.resources.GPIBInterface attribute), 129
 io_protocol (pyvisa.resources.SerialInstrument attribute), 77
 io_protocol (pyvisa.resources.TCPIPSocket attribute), 93
 io_protocol (pyvisa.resources.USBinstrument attribute), 101
 io_protocol (pyvisa.resources.USBRaw attribute), 110
 io_protocol (pyvisa.resources.VXIInstrument attribute), 153
 IOProtocol (class in pyvisa.constants), 168
 is_4882_compliant (pyvisa.resources.USBinstrument attribute), 102
 is_4882_compliant (pyvisa.resources.VXIIInstrument attribute), 153
 is_controller_in_charge (pyvisa.resources.GPIBInterface attribute), 129
 is_system_controller (pyvisa.resources.GPIBInterface attribute), 129
 issue_warning_on (pyvisa.highlevel.VisaLibraryBase attribute), 38

L

last_bit (pyvisa.constants.SerialTermination attribute), 167

last_status (pyvisa.highlevel.ResourceManager attribute), 55
last_status (pyvisa.highlevel.VisaLibraryBase attribute), 38
last_status (pyvisa.resources.FirewireInstrument attribute), 135
last_status (pyvisa.resources.GPIBInstrument attribute), 120
last_status (pyvisa.resources.GPIBInterface attribute), 129
last_status (pyvisa.resources.MessageBasedResource attribute), 63
last_status (pyvisa.resources.PXIInstrument attribute), 141
last_status (pyvisa.resources.PXIMemory attribute), 147
last_status (pyvisa.resources.RegisterBasedResource attribute), 70
last_status (pyvisa.resources.Resource attribute), 58
last_status (pyvisa.resources.SerialInstrument attribute), 77
last_status (pyvisa.resources.TCPIPIInstrument attribute), 86
lock() (pyvisa.resources.TCPIPSocket method), 94
lock() (pyvisa.resources.USBinstrument method), 102
lock() (pyvisa.resources.USBRaw method), 111
lock() (pyvisa.resources.VXIBackplane method), 164
lock() (pyvisa.resources.VXIInstrument method), 153
lock() (pyvisa.resources.VXIMemory method), 159
lock_context() (pyvisa.resources.FirewireInstrument method), 135
lock_context() (pyvisa.resources.GPIBInstrument method), 120
lock_context() (pyvisa.resources.GPIBInterface method), 130
lock_context() (pyvisa.resources.MessageBasedResource method), 63
lock_context() (pyvisa.resources.PXIInstrument method), 141
lock_context() (pyvisa.resources.PXIMemory method), 147
lock_context() (pyvisa.resources.RegisterBasedResource method), 70
lock_context() (pyvisa.resources.Resource method), 59
lock_context() (pyvisa.resources.SerialInstrument method), 78
lock_context() (pyvisa.resources.TCPIPIInstrument method), 86
lock_context() (pyvisa.resources.TCPIPSocket method), 94
lock_context() (pyvisa.resources.USBinstrument method), 102
lock_context() (pyvisa.resources.USBRaw method), 111
lock_context() (pyvisa.resources.VXIBackplane method), 164
lock_context() (pyvisa.resources.VXIInstrument method), 153
lock_context() (pyvisa.resources.VXIMemory method), 159
lock_excl() (pyvisa.resources.FirewireInstrument method), 135
lock_excl() (pyvisa.resources.GPIBInstrument method), 120
lock_excl() (pyvisa.resources.GPIBInterface method), 130
lock_excl() (pyvisa.resources.MessageBasedResource method), 63
lock_excl() (pyvisa.resources.PXIInstrument method), 141
lock_excl() (pyvisa.resources.PXIMemory method), 147
lock_excl() (pyvisa.resources.RegisterBasedResource method), 70

lock_excl() (pyvisa.resources.Resource method), 59
 lock_excl() (pyvisa.resources.SerialInstrument method), 78
 lock_excl() (pyvisa.resources.TCPIPIInstrument method), 86
 lock_excl() (pyvisa.resources.TCPIPSocket method), 94
 lock_excl() (pyvisa.resources.USBInstrument method), 102
 lock_excl() (pyvisa.resources.USBRaw method), 111
 lock_excl() (pyvisa.resources.VXIBackplane method), 165
 lock_excl() (pyvisa.resources.VXIIInstrument method), 154
 lock_excl() (pyvisa.resources.VXIMemory method), 159
 lock_state (pyvisa.resources.FirewireInstrument attribute), 136
 lock_state (pyvisa.resources.GPIBInstrument attribute), 120
 lock_state (pyvisa.resources.GPIBInterface attribute), 130
 lock_state (pyvisa.resources.MessageBasedResource attribute), 63
 lock_state (pyvisa.resources.PXIInstrument attribute), 141
 lock_state (pyvisa.resources.PXIMemory attribute), 147
 lock_state (pyvisa.resources.RegisterBasedResource attribute), 70
 lock_state (pyvisa.resources.Resource attribute), 59
 lock_state (pyvisa.resources.SerialInstrument attribute), 78
 lock_state (pyvisa.resources.TCPIPIInstrument attribute), 86
 lock_state (pyvisa.resources.TCPIPSocket attribute), 94
 lock_state (pyvisa.resources.USBInstrument attribute), 102
 lock_state (pyvisa.resources.USBRaw attribute), 111
 lock_state (pyvisa.resources.VXIBackplane attribute), 165
 lock_state (pyvisa.resources.VXIIInstrument attribute), 154
 lock_state (pyvisa.resources.VXIMemory attribute), 159

M

manufacturer_id (pyvisa.resources.PXIInstrument attribute), 141
 manufacturer_id (pyvisa.resources.USBInstrument attribute), 102
 manufacturer_id (pyvisa.resources.USBRaw attribute), 111
 manufacturer_id (pyvisa.resources.VXIIInstrument attribute), 154
 manufacturer_name (pyvisa.resources.PXIInstrument attribute), 142
 manufacturer_name (pyvisa.resources.USBInstrument attribute), 103
 manufacturer_name (pyvisa.resources.USBRaw attribute), 111
 manufacturer_name (pyvisa.resources.VXIIInstrument attribute), 154
 map_address() (pyvisa.highlevel.VisaLibraryBase method), 39
 map_trigger() (pyvisa.highlevel.VisaLibraryBase method), 39
 maximum_interrupt_size (pyvisa.resources.USBInstrument attribute), 103
 maximum_interrupt_size (pyvisa.resources.USBRaw attribute), 111
 memory_allocation() (pyvisa.highlevel.VisaLibraryBase method), 39
 memory_free() (pyvisa.highlevel.VisaLibraryBase method), 40
 MessageBasedResource (class in pyvisa.resources), 61
 model_code (pyvisa.resources.PXIInstrument attribute), 142
 model_code (pyvisa.resources.USBInstrument attribute), 103
 model_code (pyvisa.resources.USBRaw attribute), 112
 model_code (pyvisa.resources.VXIIInstrument attribute), 154
 model_name (pyvisa.resources.PXIInstrument attribute), 142
 model_name (pyvisa.resources.USBInstrument attribute), 103
 model_name (pyvisa.resources.USBRaw attribute), 112
 model_name (pyvisa.resources.VXIIInstrument attribute), 154
 move() (pyvisa.highlevel.VisaLibraryBase method), 40
 move_asynchronously() (pyvisa.highlevel.VisaLibraryBase method), 40
 move_in() (pyvisa.highlevel.VisaLibraryBase method), 41
 move_in() (pyvisa.resources.FirewireInstrument method), 136
 move_in() (pyvisa.resources.PXIInstrument method), 142
 move_in() (pyvisa.resources.PXIMemory method), 147
 move_in() (pyvisa.resources.RegisterBasedResource method), 70
 move_in() (pyvisa.resources.VXIMemory method), 159
 move_in_16() (pyvisa.highlevel.VisaLibraryBase method), 41
 move_in_32() (pyvisa.highlevel.VisaLibraryBase method), 41
 move_in_64() (pyvisa.highlevel.VisaLibraryBase method), 42
 move_in_8() (pyvisa.highlevel.VisaLibraryBase method), 42

move_out() (pyvisa.highlevel.VisaLibraryBase method), 42
move_out() (pyvisa.resources.FirewireInstrument method), 136
move_out() (pyvisa.resources.PXIInstrument method), 142
move_out() (pyvisa.resources.PXIMemory method), 148
move_out() (pyvisa.resources.RegisterBasedResource method), 71
move_out() (pyvisa.resources.VXIMemory method), 159
move_out_16() (pyvisa.highlevel.VisaLibraryBase method), 43
move_out_32() (pyvisa.highlevel.VisaLibraryBase method), 43
move_out_64() (pyvisa.highlevel.VisaLibraryBase method), 43
move_out_8() (pyvisa.highlevel.VisaLibraryBase method), 44

N

ndac_state (pyvisa.resources.GPIBInterface attribute), 130
no_lock (pyvisa.constants.AccessModes attribute), 167
none (pyvisa.constants.SerialTermination attribute), 167

O

open() (pyvisa.highlevel.VisaLibraryBase method), 44
open() (pyvisa.resources.FirewireInstrument method), 136
open() (pyvisa.resources.GPIBInstrument method), 120
open() (pyvisa.resources.GPIBInterface method), 130
open() (pyvisa.resources.MessageBasedResource method), 63
open() (pyvisa.resources.PXIInstrument method), 142
open() (pyvisa.resources.PXIMemory method), 148
open() (pyvisa.resources.RegisterBasedResource method), 71
open() (pyvisa.resources.Resource method), 59
open() (pyvisa.resources.SerialInstrument method), 78
open() (pyvisa.resources.TCPIPInstrument method), 87
open() (pyvisa.resources.TCPIPSocket method), 94
open() (pyvisa.resources.USBInstrument method), 103
open() (pyvisa.resources.USBRaw method), 112
open() (pyvisa.resources.VXIBackplane method), 165
open() (pyvisa.resources.VXIIInstrument method), 154
open() (pyvisa.resources.VXIMemory method), 160
open_bare_resource() (pyvisa.highlevel.ResourceManager method), 55
open_default_resource_manager() (pyvisa.highlevel.VisaLibraryBase method), 44
open_resource() (pyvisa.highlevel.ResourceManager method), 56
out_16() (pyvisa.highlevel.VisaLibraryBase method), 45
out_32() (pyvisa.highlevel.VisaLibraryBase method), 45

out_64() (pyvisa.highlevel.VisaLibraryBase method), 45
out_8() (pyvisa.highlevel.VisaLibraryBase method), 45

P

Parity (class in pyvisa.constants), 167
parity (pyvisa.resources.SerialInstrument attribute), 78
parse_resource() (pyvisa.highlevel.VisaLibraryBase method), 46
parse_resource_extended() (pyvisa.highlevel.VisaLibraryBase method), 46
pass_control() (pyvisa.resources.GPIBInstrument method), 120
pass_control() (pyvisa.resources.GPIBInterface method), 130
peek() (pyvisa.highlevel.VisaLibraryBase method), 46
peek_16() (pyvisa.highlevel.VisaLibraryBase method), 47
peek_32() (pyvisa.highlevel.VisaLibraryBase method), 47
peek_64() (pyvisa.highlevel.VisaLibraryBase method), 47
peek_8() (pyvisa.highlevel.VisaLibraryBase method), 47
poke() (pyvisa.highlevel.VisaLibraryBase method), 47
poke_16() (pyvisa.highlevel.VisaLibraryBase method), 48
poke_32() (pyvisa.highlevel.VisaLibraryBase method), 48
poke_64() (pyvisa.highlevel.VisaLibraryBase method), 48
poke_8() (pyvisa.highlevel.VisaLibraryBase method), 48
primary_address (pyvisa.resources.GPIBInstrument attribute), 121
primary_address (pyvisa.resources.GPIBInterface attribute), 131
protocol4882_strs (pyvisa.constants.IOProtocol attribute), 168
pxi (pyvisa.constants.InterfaceType attribute), 168
PXIIInstrument (class in pyvisa.resources), 139
PXIMemory (class in pyvisa.resources), 145
pyvisa.constants (module), 167

Q

query() (pyvisa.resources.GPIBInstrument method), 121
query() (pyvisa.resources.MessageBasedResource method), 64
query() (pyvisa.resources.SerialInstrument method), 78
query() (pyvisa.resources.TCPIPInstrument method), 87
query() (pyvisa.resources.TCPIPSocket method), 94
query() (pyvisa.resources.USBInstrument method), 103
query() (pyvisa.resources.USBRaw method), 112
query_ascii_values() (pyvisa.resources.GPIBInstrument method), 121
query_ascii_values() (pyvisa.resources.MessageBasedResource method), 64

query_ascii_values() (pyvisa.resources.SerialInstrument method), 79
query_ascii_values() (pyvisa.resources.TCPIPIInstrument method), 87
query_ascii_values() (pyvisa.resources.TCPIPSocket method), 95
query_ascii_values() (pyvisa.resources.USBInstrument method), 103
query_ascii_values() (pyvisa.resources.USBRaw method), 112
query_binary_values() (pyvisa.resources.GPIBInstrument method), 121
query_binary_values() (pyvisa.resources.MessageBasedResource method), 64
query_binary_values() (pyvisa.resources.SerialInstrument method), 79
query_binary_values() (pyvisa.resources.TCPIPIInstrument method), 87
query_binary_values() (pyvisa.resources.TCPIPSocket method), 95
query_binary_values() (pyvisa.resources.USBInstrument method), 104
query_binary_values() (pyvisa.resources.USBRaw method), 113
query_delay, 13
query_delay (pyvisa.resources.GPIBInstrument attribute), 122
query_delay (pyvisa.resources.MessageBasedResource attribute), 64
query_delay (pyvisa.resources.SerialInstrument attribute), 79
query_delay (pyvisa.resources.TCPIPIInstrument attribute), 88
query_delay (pyvisa.resources.TCPIPSocket attribute), 95
query_delay (pyvisa.resources.USBInstrument attribute), 104
query_delay (pyvisa.resources.USBRaw attribute), 113
query_values() (pyvisa.resources.GPIBInstrument method), 122
query_values() (pyvisa.resources.MessageBasedResource method), 64
query_values() (pyvisa.resources.SerialInstrument method), 79
query_values() (pyvisa.resources.TCPIPIInstrument method), 88
query_values() (pyvisa.resources.TCPIPSocket method), 95
query_values() (pyvisa.resources.USBInstrument method), 104
query_values() (pyvisa.resources.USBRaw method), 113
R
read() (pyvisa.highlevel.VisaLibraryBase method), 49
read() (pyvisa.resources.GPIBInstrument method), 122
read() (pyvisa.resources.MessageBasedResource method), 65
read() (pyvisa.resources.SerialInstrument method), 79
read() (pyvisa.resources.TCPIPIInstrument method), 88
read() (pyvisa.resources.TCPIPSocket method), 95
read() (pyvisa.resources.USBInstrument method), 104
read() (pyvisa.resources.USBRaw method), 113
read_asynchronously() (pyvisa.highlevel.VisaLibraryBase method), 49
read_memory() (pyvisa.highlevel.VisaLibraryBase method), 49
read_memory() (pyvisa.resources.FirewireInstrument method), 136
read_memory() (pyvisa.resources.PXIInstrument method), 142
read_memory() (pyvisa.resources.PXIMemory method), 148
read_memory() (pyvisa.resources.RegisterBasedResource method), 71
read_memory() (pyvisa.resources.VXIMemory method), 160
read_raw() (pyvisa.resources.GPIBInstrument method), 122
read_raw() (pyvisa.resources.MessageBasedResource method), 65
read_raw() (pyvisa.resources.SerialInstrument method), 80
read_raw() (pyvisa.resources.TCPIPIInstrument method), 88
read_raw() (pyvisa.resources.TCPIPSocket method), 96
read_raw() (pyvisa.resources.USBInstrument method), 104
read_raw() (pyvisa.resources.USBRaw method), 113
read_stb() (pyvisa.highlevel.VisaLibraryBase method), 49
read_stb() (pyvisa.resources.GPIBInstrument method), 122
read_stb() (pyvisa.resources.MessageBasedResource method), 65
read_stb() (pyvisa.resources.SerialInstrument method), 80
read_stb() (pyvisa.resources.TCPIPIInstrument method), 88
read_stb() (pyvisa.resources.TCPIPSocket method), 96
read_stb() (pyvisa.resources.USBInstrument method), 105
read_stb() (pyvisa.resources.USBRaw method), 113
read_termination (pyvisa.resources.GPIBInstrument attribute), 122
read_termination (pyvisa.resources.MessageBasedResource attribute), 65
read_termination (pyvisa.resources.SerialInstrument attribute), 80

read_termination (pyvisa.resources.TCPIPIInstrument attribute), 88
read_termination (pyvisa.resources.TCPIPSocket attribute), 96
read_termination (pyvisa.resources.USBInstrument attribute), 105
read_termination (pyvisa.resources.USBRaw attribute), 113
read_termination_context() (pyvisa.resources.GPIBInstrument method), 122
read_termination_context() (pyvisa.resources.MessageBasedResource method), 65
read_termination_context() (pyvisa.resources.SerialInstrument method), 80
read_termination_context() (pyvisa.resources.TCPIPIInstrument method), 88
read_termination_context() (pyvisa.resources.TCPIPSocket method), 96
read_termination_context() (pyvisa.resources.USBInstrument method), 105
read_termination_context() (pyvisa.resources.USBRaw method), 113
read_to_file() (pyvisa.highlevel.VisaLibraryBase method), 50
read_values() (pyvisa.resources.GPIBInstrument method), 122
read_values() (pyvisa.resources.MessageBasedResource method), 65
read_values() (pyvisa.resources.SerialInstrument method), 80
read_values() (pyvisa.resources.TCPIPIInstrument method), 88
read_values() (pyvisa.resources.TCPIPSocket method), 96
read_values() (pyvisa.resources.USBInstrument method), 105
read_values() (pyvisa.resources.USBRaw method), 113
register() (pyvisa.resources.FirewireInstrument method), 137
register() (pyvisa.resources.GPIBInstrument method), 123
register() (pyvisa.resources.GPIBInterface method), 131
register() (pyvisa.resources.MessageBasedResource method), 65
register() (pyvisa.resources.PXIInstrument method), 143
register() (pyvisa.resources.PXIMemory method), 148
register() (pyvisa.resources.RegisterBasedResource method), 71
register() (pyvisa.resources.Resource class method), 59
register() (pyvisa.resources.SerialInstrument method), 80
register() (pyvisa.resources.TCPIPIInstrument method), 89
register() (pyvisa.resources.TCPIPSocket attribute), 96
register() (pyvisa.resources.USBInstrument attribute), 105
register() (pyvisa.resources.USBRaw attribute), 114
register() (pyvisa.resources.VXIBackplane attribute), 165
register() (pyvisa.resources.VXIInstrument attribute), 154
register() (pyvisa.resources.VXIMemory attribute), 160
RegisterBasedResource (class in pyvisa.resources), 68
remote_enabled (pyvisa.resources.GPIBInstrument attribute), 123
remote_enabled (pyvisa.resources.GPIBInterface attribute), 131
replace_char (pyvisa.resources.SerialInstrument attribute), 80
Resource (class in pyvisa.resources), 57
resource_class (pyvisa.resources.FirewireInstrument attribute), 137
resource_class (pyvisa.resources.GPIBInstrument attribute), 123
resource_class (pyvisa.resources.GPIBInterface attribute), 131
resource_class (pyvisa.resources.MessageBasedResource attribute), 65
resource_class (pyvisa.resources.PXIInstrument attribute), 143
resource_class (pyvisa.resources.PXIMemory attribute), 148
resource_class (pyvisa.resources.RegisterBasedResource attribute), 71
resource_class (pyvisa.resources.Resource attribute), 59
resource_class (pyvisa.resources.SerialInstrument attribute), 80
resource_class (pyvisa.resources.TCPIPIInstrument attribute), 89
resource_class (pyvisa.resources.TCPIPSocket attribute), 96
resource_class (pyvisa.resources.USBInstrument attribute), 105
resource_class (pyvisa.resources.USBRaw attribute), 114
resource_class (pyvisa.resources.VXIBackplane attribute), 165
resource_class (pyvisa.resources.VXIInstrument attribute), 154
resource_class (pyvisa.resources.VXIMemory attribute), 160
resource_info (pyvisa.resources.FirewireInstrument attribute), 137
resource_info (pyvisa.resources.GPIBInstrument attribute), 123
resource_info (pyvisa.resources.GPIBInterface attribute), 131

resource_info (pyvisa.resources.MessageBasedResource attribute), 65
 resource_info (pyvisa.resources.PXIInstrument attribute), 143
 resource_info (pyvisa.resources.PXIMemory attribute), 149
 resource_info (pyvisa.resources.RegisterBasedResource attribute), 72
 resource_info (pyvisa.resources.Resource attribute), 59
 resource_info (pyvisa.resources.SerialInstrument attribute), 80
 resource_info (pyvisa.resources.TCPIPIInstrument attribute), 89
 resource_info (pyvisa.resources.TCPIPSocket attribute), 96
 resource_info (pyvisa.resources.USBInstrument attribute), 105
 resource_info (pyvisa.resources.USBRaw attribute), 114
 resource_info (pyvisa.resources.VXIBackplane attribute), 165
 resource_info (pyvisa.resources.VXIIInstrument attribute), 154
 resource_info (pyvisa.resources.VXIMemory attribute), 160
 resource_info() (pyvisa.highlevel.ResourceManager method), 56
 resource_manager (pyvisa.highlevel.VisaLibraryBase attribute), 50
 resource_manufacturer_name (pyvisa.resources.FirewireInstrument attribute), 137
 resource_manufacturer_name (pyvisa.resources.GPIBInstrument attribute), 123
 resource_manufacturer_name (pyvisa.resources.GPIBInterface attribute), 131
 resource_manufacturer_name (pyvisa.resources.MessageBasedResource attribute), 66
 resource_manufacturer_name (pyvisa.resources.PXIInstrument attribute), 143
 resource_manufacturer_name (pyvisa.resources.PXIMemory attribute), 149
 resource_manufacturer_name (pyvisa.resources.RegisterBasedResource attribute), 72
 resource_manufacturer_name (pyvisa.resources.Resource attribute), 59
 resource_manufacturer_name (pyvisa.resources.SerialInstrument attribute), 80
 resource_manufacturer_name (pyvisa.resources.TCPIPIInstrument attribute), 89
 resource_manufacturer_name (pyvisa.resources.TCPIPSocket attribute), 96
 resource_manufacturer_name (pyvisa.resources.USBInstrument attribute), 105
 resource_manufacturer_name (pyvisa.resources.USBRaw attribute), 114
 resource_manufacturer_name (pyvisa.resources.VXIBackplane attribute), 165
 resource_manufacturer_name (pyvisa.resources.VXIIInstrument attribute), 155
 resource_manufacturer_name (pyvisa.resources.VXIMemory attribute), 160
 resource_name (pyvisa.resources.FirewireInstrument attribute), 137
 resource_name (pyvisa.resources.GPIBInstrument attribute), 123
 resource_name (pyvisa.resources.GPIBInterface attribute), 131
 resource_name (pyvisa.resources.MessageBasedResource attribute), 66
 resource_name (pyvisa.resources.PXIInstrument attribute), 143
 resource_name (pyvisa.resources.PXIMemory attribute), 149
 resource_name (pyvisa.resources.RegisterBasedResource attribute), 72
 resource_name (pyvisa.resources.Resource attribute), 60
 resource_name (pyvisa.resources.SerialInstrument attribute), 81
 resource_name (pyvisa.resources.TCPIPIInstrument attribute), 89
 resource_name (pyvisa.resources.TCPIPSocket attribute), 97
 resource_name (pyvisa.resources.USBInstrument attribute), 105
 resource_name (pyvisa.resources.USBRaw attribute), 114
 resource_name (pyvisa.resources.VXIBackplane attribute), 165
 resource_name (pyvisa.resources.VXIIInstrument attribute), 155
 resource_name (pyvisa.resources.VXIMemory attribute), 161
 ResourceInfo (class in pyvisa.highlevel), 55
 ResourceManager (class in pyvisa.highlevel), 55
 rio (pyvisa.constants.InterfaceType attribute), 168

rsnrp (pyvisa.constants.InterfaceType attribute), 168

S

secondary_address (pyvisa.resources.GPIBInstrument attribute), 123
secondary_address (pyvisa.resources.GPIBInterface attribute), 132
send_command() (pyvisa.resources.GPIBInstrument method), 124
send_command() (pyvisa.resources.GPIBInterface method), 132
send_end, 13
send_end (pyvisa.resources.GPIBInstrument attribute), 124
send_end (pyvisa.resources.GPIBInterface attribute), 132
send_end (pyvisa.resources.SerialInstrument attribute), 81
send_end (pyvisa.resources.TCPIPIInstrument attribute), 89
send_end (pyvisa.resources.USBIInstrument attribute), 106
send_end (pyvisa.resources.VXIInstrument attribute), 155
send_ifc() (pyvisa.resources.GPIBInstrument method), 124
send_ifc() (pyvisa.resources.GPIBInterface method), 132
serial_number (pyvisa.resources.USBIInstrument attribute), 106
serial_number (pyvisa.resources.USBRaw attribute), 114
SerialInstrument (class in pyvisa.resources), 73
SerialTermination (class in pyvisa.constants), 167
session (pyvisa.highlevel.ResourceManager attribute), 56
session (pyvisa.resources.FirewireInstrument attribute), 137
session (pyvisa.resources.GPIBInstrument attribute), 124
session (pyvisa.resources.GPIBInterface attribute), 132
session (pyvisa.resources.MessageBasedResource attribute), 66
session (pyvisa.resources.PXIIInstrument attribute), 143
session (pyvisa.resources.PXIMemory attribute), 149
session (pyvisa.resources.RegisterBasedResource attribute), 72
session (pyvisa.resources.Resource attribute), 60
session (pyvisa.resources.SerialInstrument attribute), 81
session (pyvisa.resources.TCPIPIInstrument attribute), 89
session (pyvisa.resources.TCPIPSocket attribute), 97
session (pyvisa.resources.USBIInstrument attribute), 106
session (pyvisa.resources.USBRaw attribute), 114
session (pyvisa.resources.VXIBackplane attribute), 166
session (pyvisa.resources.VXIInstrument attribute), 155
session (pyvisa.resources.VXIMemory attribute), 161
set_attribute() (pyvisa.highlevel.VisaLibraryBase method), 50

set_buffer() (pyvisa.highlevel.VisaLibraryBase method), 50
set_visa_attribute() (pyvisa.resources.FirewireInstrument method), 137
set_visa_attribute() (pyvisa.resources.GPIBInstrument method), 124
set_visa_attribute() (pyvisa.resources.GPIBInterface method), 132
set_visa_attribute() (pyvisa.resources.MessageBasedResource method), 66
set_visa_attribute() (pyvisa.resources.PXIIInstrument method), 143
set_visa_attribute() (pyvisa.resources.PXIMemory method), 149
set_visa_attribute() (pyvisa.resources.RegisterBasedResource method), 72
set_visa_attribute() (pyvisa.resources.Resource method), 60
set_visa_attribute() (pyvisa.resources.SerialInstrument method), 81
set_visa_attribute() (pyvisa.resources.TCPIPIInstrument method), 89
set_visa_attribute() (pyvisa.resources.TCPIPSocket method), 97
set_visa_attribute() (pyvisa.resources.USBIInstrument method), 106
set_visa_attribute() (pyvisa.resources.USBRaw method), 114
set_visa_attribute() (pyvisa.resources.VXIBackplane method), 166
set_visa_attribute() (pyvisa.resources.VXIInstrument method), 155
set_visa_attribute() (pyvisa.resources.VXIMemory method), 161
shared_lock (pyvisa.constants.AccessModes attribute), 167
source_increment (pyvisa.resources.PXIIInstrument attribute), 144
source_increment (pyvisa.resources.PXIMemory attribute), 149
source_increment (pyvisa.resources.VXIInstrument attribute), 155
source_increment (pyvisa.resources.VXIMemory attribute), 161
spec_version (pyvisa.resources.FirewireInstrument attribute), 137
spec_version (pyvisa.resources.GPIBInstrument attribute), 124
spec_version (pyvisa.resources.GPIBInterface attribute), 132
spec_version (pyvisa.resources.MessageBasedResource attribute), 66
spec_version (pyvisa.resources.PXIIInstrument attribute), 144

spec_version (pyvisa.resources.PXIMemory attribute), 149
 spec_version (pyvisa.resources.RegisterBasedResource attribute), 72
 spec_version (pyvisa.resources.Resource attribute), 60
 spec_version (pyvisa.resources.SerialInstrument attribute), 81
 spec_version (pyvisa.resources.TCPIPIInstrument attribute), 89
 spec_version (pyvisa.resources.TCPIPSocket attribute), 97
 spec_version (pyvisa.resources.USBInstrument attribute), 106
 spec_version (pyvisa.resources.USBRaw attribute), 115
 spec_version (pyvisa.resources.VXIBackplane attribute), 166
 spec_version (pyvisa.resources.VXIInstrument attribute), 156
 spec_version (pyvisa.resources.VXIMemory attribute), 161
 status_description() (pyvisa.highlevel.VisaLibraryBase method), 50
 StatusCode (class in pyvisa.constants), 168
 stb (pyvisa.resources.GPIBInstrument attribute), 124
 stb (pyvisa.resources.MessageBasedResource attribute), 66
 stb (pyvisa.resources.SerialInstrument attribute), 81
 stb (pyvisa.resources.TCPIPIInstrument attribute), 90
 stb (pyvisa.resources.TCPIPSocket attribute), 97
 stb (pyvisa.resources.USBInstrument attribute), 106
 stb (pyvisa.resources.USBRaw attribute), 115
 stop_bits (pyvisa.resources.SerialInstrument attribute), 81
 StopBits (class in pyvisa.constants), 167
 success (pyvisa.constants.StatusCode attribute), 172
 success_device_not_present (pyvisa.constants.StatusCode attribute), 172
 success_event_already_disabled (pyvisa.constants.StatusCode attribute), 172
 success_event_already_enabled (pyvisa.constants.StatusCode attribute), 172
 success_max_count_read (pyvisa.constants.StatusCode attribute), 172
 success_nested_exclusive (pyvisa.constants.StatusCode attribute), 172
 success_nested_shared (pyvisa.constants.StatusCode attribute), 172
 success_no_more_handler_calls_in_chain (pyvisa.constants.StatusCode attribute), 172
 success_queue_already_empty (pyvisa.constants.StatusCode attribute), 172
 success_queue_not_empty (pyvisa.constants.StatusCode attribute), 172
 success_synchronous (pyvisa.constants.StatusCode attribute), 172
 success_termination_character_read (pyvisa.constants.StatusCode attribute), 173
 success_trigger_already_mapped (pyvisa.constants.StatusCode attribute), 173

T

tcpip (pyvisa.constants.InterfaceType attribute), 168
 TCPIPIInstrument (class in pyvisa.resources), 84
 TCPIPSocket (class in pyvisa.resources), 92
 terminate() (pyvisa.highlevel.VisaLibraryBase method), 51
 termination_break (pyvisa.constants.SerialTermination attribute), 167
 termination_char (pyvisa.constants.SerialTermination attribute), 167
 timeout (pyvisa.resources.FirewireInstrument attribute), 138
 timeout (pyvisa.resources.GPIBInstrument attribute), 124
 timeout (pyvisa.resources.GPIBInterface attribute), 133
 timeout (pyvisa.resources.MessageBasedResource attribute), 66
 timeout (pyvisa.resources.PXIInstrument attribute), 144
 timeout (pyvisa.resources.PXIMemory attribute), 150
 timeout (pyvisa.resources.RegisterBasedResource attribute), 72
 timeout (pyvisa.resources.Resource attribute), 60
 timeout (pyvisa.resources.SerialInstrument attribute), 82
 timeout (pyvisa.resources.TCPIPIInstrument attribute), 90
 timeout (pyvisa.resources.TCPIPSocket attribute), 97
 timeout (pyvisa.resources.USBInstrument attribute), 106
 timeout (pyvisa.resources.USBRaw attribute), 115
 timeout (pyvisa.resources.VXIBackplane attribute), 166
 timeout (pyvisa.resources.VXIInstrument attribute), 156
 timeout (pyvisa.resources.VXIMemory attribute), 161

U

uninstall_all_visa_handlers() (pyvisa.highlevel.VisaLibraryBase method), 51
 uninstall_handler() (pyvisa.highlevel.VisaLibraryBase method), 51
 uninstall_handler() (pyvisa.resources.FirewireInstrument method), 138
 uninstall_handler() (pyvisa.resources.GPIBInstrument method), 125
 uninstall_handler() (pyvisa.resources.GPIBInterface method), 133
 uninstall_handler() (pyvisa.resources.MessageBasedResource method), 67
 uninstall_handler() (pyvisa.resources.PXIInstrument method), 144
 uninstall_handler() (pyvisa.resources.PXIMemory method), 150
 uninstall_handler() (pyvisa.resources.RegisterBasedResource method), 73

uninstall_handler() (pyvisa.resources.Resource method), 61
uninstall_handler() (pyvisa.resources.SerialInstrument method), 82
uninstall_handler() (pyvisa.resources.TCPIPIInstrument method), 90
uninstall_handler() (pyvisa.resources.TCPIPSocket method), 97
uninstall_handler() (pyvisa.resources.USBInstrument method), 107
uninstall_handler() (pyvisa.resources.USBRaw method), 115
uninstall_handler() (pyvisa.resources.VXIBackplane method), 166
uninstall_handler() (pyvisa.resources.VXIInstrument method), 156
uninstall_handler() (pyvisa.resources.VXIMemory method), 162
uninstall_visa_handler() (pyvisa.highlevel.VisaLibraryBase method), 51
unlock() (pyvisa.highlevel.VisaLibraryBase method), 51
unlock() (pyvisa.resources.FirewireInstrument method), 138
unlock() (pyvisa.resources.GPIBInstrument method), 125
unlock() (pyvisa.resources.GPIBInterface method), 133
unlock() (pyvisa.resources.MessageBasedResource method), 67
unlock() (pyvisa.resources.PXIInstrument method), 144
unlock() (pyvisa.resources.PXIMemory method), 150
unlock() (pyvisa.resources.RegisterBasedResource method), 73
unlock() (pyvisa.resources.Resource method), 61
unlock() (pyvisa.resources.SerialInstrument method), 82
unlock() (pyvisa.resources.TCPIPIInstrument method), 90
unlock() (pyvisa.resources.TCPIPSocket method), 98
unlock() (pyvisa.resources.USBInstrument method), 107
unlock() (pyvisa.resources.USBRaw method), 115
unlock() (pyvisa.resources.VXIBackplane method), 166
unlock() (pyvisa.resources.VXIInstrument method), 156
unlock() (pyvisa.resources.VXIMemory method), 162
unmap_address() (pyvisa.highlevel.VisaLibraryBase method), 52
unmap_trigger() (pyvisa.highlevel.VisaLibraryBase method), 52
usb (pyvisa.constants.InterfaceType attribute), 168
usb_control_in() (pyvisa.highlevel.VisaLibraryBase method), 52
usb_control_out() (pyvisa.highlevel.VisaLibraryBase method), 53
usb_control_out() (pyvisa.resources.USBInstrument method), 107
usb_protocol (pyvisa.resources.USBInstrument attribute), 107
usb_protocol (pyvisa.resources.USBRaw attribute), 115
USBInstrument (class in pyvisa.resources), 99
USBRaw (class in pyvisa.resources), 108
usbtmc_vendor (pyvisa.constants.IOProtocol attribute), 168

V

values_format (pyvisa.resources.GPIBInstrument attribute), 125
values_format (pyvisa.resources.MessageBasedResource attribute), 67
values_format (pyvisa.resources.SerialInstrument attribute), 82
values_format (pyvisa.resources.TCPIPIInstrument attribute), 90
values_format (pyvisa.resources.TCPIPSocket attribute), 98
values_format (pyvisa.resources.USBInstrument attribute), 107
values_format (pyvisa.resources.USBRaw attribute), 116
visa_attributes_classes (pyvisa.resources.FirewireInstrument attribute), 138
visa_attributes_classes (pyvisa.resources.GPIBInstrument attribute), 125
visa_attributes_classes (pyvisa.resources.GPIBInterface attribute), 133
visa_attributes_classes (pyvisa.resources.MessageBasedResource attribute), 67
visa_attributes_classes (pyvisa.resources.PXIInstrument attribute), 144
visa_attributes_classes (pyvisa.resources.PXIMemory attribute), 150
visa_attributes_classes (pyvisa.resources.RegisterBasedResource attribute), 73
visa_attributes_classes (pyvisa.resources.Resource attribute), 61
visa_attributes_classes (pyvisa.resources.SerialInstrument attribute), 82
visa_attributes_classes (pyvisa.resources.TCPIPIInstrument attribute), 90
visa_attributes_classes (pyvisa.resources.TCPIPSocket attribute), 98
visa_attributes_classes (pyvisa.resources.USBInstrument attribute), 107
visa_attributes_classes (pyvisa.resources.USBRaw attribute), 116
visa_attributes_classes (pyvisa.resources.VXIBackplane attribute), 166
visa_attributes_classes (pyvisa.resources.VXIInstrument attribute), 156
visa_attributes_classes (pyvisa.resources.VXIMemory attribute), 162
VisaLibraryBase (class in pyvisa.highlevel), 32
vxi (pyvisa.constants.InterfaceType attribute), 168

vxi_command_query() (pyvisa.highlevel.VisaLibraryBase method), 53

VXIBackplane (class in pyvisa.resources), 162

VXIInstrument (class in pyvisa.resources), 151

VXIMemory (class in pyvisa.resources), 157

W

wait_for_srq() (pyvisa.resources.GPIBInstrument method), 125

wait_on_event() (pyvisa.highlevel.VisaLibraryBase method), 53

wait_on_event() (pyvisa.resources.FirewireInstrument method), 138

wait_on_event() (pyvisa.resources.GPIBInstrument method), 125

wait_on_event() (pyvisa.resources.GPIBInterface method), 133

wait_on_event() (pyvisa.resources.MessageBasedResource method), 67

wait_on_event() (pyvisa.resources.PXIInstrument method), 144

wait_on_event() (pyvisa.resources.PXIMemory method), 150

wait_on_event() (pyvisa.resources.RegisterBasedResource method), 73

wait_on_event() (pyvisa.resources.Resource method), 61

wait_on_event() (pyvisa.resources.SerialInstrument method), 82

wait_on_event() (pyvisa.resources.TCPIPIInstrument method), 90

wait_on_event() (pyvisa.resources.TCPIPSocket method), 98

wait_on_event() (pyvisa.resources.USBInstrument method), 107

wait_on_event() (pyvisa.resources.USBRaw method), 116

wait_on_event() (pyvisa.resources.VXIBackplane method), 166

wait_on_event() (pyvisa.resources.VXIInstrument method), 156

wait_on_event() (pyvisa.resources.VXIMemory method), 162

warning_configuration_not_loaded
 (pyvisa.constants.StatusCode attribute), 173

warning_ext_function_not_implemented
 (pyvisa.constants.StatusCode attribute), 173

warning_nonsupported_attribute_state
 (pyvisa.constants.StatusCode attribute), 173

warning_nonsupported_buffer
 (pyvisa.constants.StatusCode attribute), 173

warning_null_object
 (pyvisa.constants.StatusCode attribute), 173

warning_queue_overflow
 (pyvisa.constants.StatusCode attribute), 173

warning_unknown_status (pyvisa.constants.StatusCode attribute), 173

write() (pyvisa.highlevel.VisaLibraryBase method), 54

write() (pyvisa.resources.GPIBInstrument method), 125

write()
 (pyvisa.resources.MessageBasedResource method), 67

write() (pyvisa.resources.SerialInstrument method), 82

write() (pyvisa.resources.TCPIPIInstrument method), 91

write() (pyvisa.resources.TCPIPSocket method), 98

write() (pyvisa.resources.USBInstrument method), 107

write() (pyvisa.resources.USBRaw method), 116

write_ascii_values() (pyvisa.resources.GPIBInstrument method), 126

write_ascii_values() (pyvisa.resources.MessageBasedResource method), 67

write_ascii_values() (pyvisa.resources.SerialInstrument method), 83

write_ascii_values() (pyvisa.resources.TCPIPIInstrument method), 91

write_ascii_values() (pyvisa.resources.TCPIPSocket method), 98

write_ascii_values() (pyvisa.resources.USBInstrument method), 108

write_ascii_values() (pyvisa.resources.USBRaw method), 116

write_asynchronously() (pyvisa.highlevel.VisaLibraryBase method), 54

write_binary_values() (pyvisa.resources.GPIBInstrument method), 126

write_binary_values() (pyvisa.resources.MessageBasedResource method), 68

write_binary_values() (pyvisa.resources.SerialInstrument method), 83

write_binary_values() (pyvisa.resources.TCPIPIInstrument method), 91

write_binary_values() (pyvisa.resources.TCPIPSocket method), 99

write_binary_values() (pyvisa.resources.USBInstrument method), 108

write_binary_values() (pyvisa.resources.USBRaw method), 116

write_from_file() (pyvisa.highlevel.VisaLibraryBase method), 54

write_memory() (pyvisa.highlevel.VisaLibraryBase method), 54

write_memory() (pyvisa.resources.FirewireInstrument method), 138

write_memory() (pyvisa.resources.PXIInstrument method), 145

write_memory() (pyvisa.resources.PXIMemory method), 150

write_memory() (pyvisa.resources.RegisterBasedResource method), 73

write_memory() (pyvisa.resources.VXIMemory method),
162
write_raw() (pyvisa.resources.GPIBInstrument method),
126
write_raw() (pyvisa.resources.MessageBasedResource
method), 68
write_raw() (pyvisa.resources.SerialInstrument method),
83
write_raw() (pyvisa.resources.TCPIPIInstrument method),
91
write_raw() (pyvisa.resources.TCPIPSocket method), 99
write_raw() (pyvisa.resources.USBInstrument method),
108
write_raw() (pyvisa.resources.USBRaw method), 117
write_termination (pyvisa.resources.GPIBInstrument at-
tribute), 126
write_termination (pyvisa.resources.MessageBasedResource
attribute), 68
write_termination (pyvisa.resources.SerialInstrument at-
tribute), 83
write_termination (pyvisa.resources.TCPIPIInstrument at-
tribute), 91
write_termination (pyvisa.resources.TCPIPSocket at-
tribute), 99
write_termination (pyvisa.resources.USBInstrument at-
tribute), 108
write_termination (pyvisa.resources.USBRaw attribute),
117
write_values() (pyvisa.resources.GPIBInstrument
method), 126
write_values() (pyvisa.resources.MessageBasedResource
method), 68
write_values() (pyvisa.resources.SerialInstrument
method), 83
write_values() (pyvisa.resources.TCPIPIInstrument
method), 91
write_values() (pyvisa.resources.TCPIPSocket method),
99
write_values() (pyvisa.resources.USBInstrument
method), 108
write_values() (pyvisa.resources.USBRaw method), 117

X

xoff_char (pyvisa.resources.SerialInstrument attribute),
83
xon_char (pyvisa.resources.SerialInstrument attribute),
84